BEFORE
THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

DIRECT TESTIMONY
OF
AARON L. ROTHSCHILD

COST OF CAPITAL

ON BEHALF OF
THE SOUTH CAROLINA DEPARTMENT OF CONSUMER AFFAIRS

DOCKET NO. 2020-125-E

November 10, 2020

Contents

I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Aaron L. Rothschild. My title is President and my business address is 15 Lake Road, Ridgefield, CT.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Rothschild Financial Consulting.

Q. PLEASE STATE YOUR EDUCATIONAL ACHIEVEMENTS AND PROFESSIONAL DESIGNATIONS.

A. I have a B.A. (1994) degree from Clark University in mathematics and an M.B.A. (1996) from Vanderbilt University.

Q. PLEASE DESCRIBE YOUR BUSINESS EXPERIENCE.

A. I provided financial analysis in the telecom industry in the United States and Asia Pacific from 1996 to 2001, investment banking consulting in New York, complex systems science research regarding the power sector at an independent research institute, and I have prepared rate of return testimonies since 2002. My business experience includes providing expert witness services to the California Public Advocates Office to evaluate the financial health, basic operation, wildfire cost recovery, and organizational culture/governance of gas and electric utilities,[1] as well as evaluating bankruptcy restructuring plans for Pacific Gas and Electric. See Exhibit ALR-1 for my resume.

[1] The California Public Utility Commission's PG&E Safety Culture Investigation 15-08-019.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION, OR OTHER STATE COMMISSIONS? IF SO, WHICH COMMISSIONS?

A. Yes, I have testified before this Commission previously. My expert witness experience includes testifying in over 50 cost of capital proceedings before the following state commissions: California, Colorado, Connecticut, Delaware, Florida, New Jersey, Maryland, North Dakota, Pennsylvania, South Carolina, and Vermont. See Exhibit ALR-1 for the list of dockets for each of my testimonies.

Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?

A. The South Carolina Department of Consumer Affairs ("DCA").

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to provide my recommendations to the Public Service Commission of South Carolina ("Commission") regarding the appropriate cost of equity, capital structure and overall cost of capital for Dominion Energy South Carolina, Inc. ("DESC" or "Company").

Q. HAVE YOU REVIEWED DESC'S APPLICATION AND DIRECT TESTIMONY?

A. Yes.

II. SUMMARY OF CONCLUSIONS

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. I recommend the following cost of capital for DESC's retail electric service operations:

- An overall cost of capital of 7.55% (7.33% - 7.76%)[2]
- A cost of equity of 8.63% (8.19% - 9.07%)
- A capital structure containing 50.00% common equity and 50.00% debt
- A debt cost rate of 6.46%

A summary of my cost of capital recommendations for DESC's retail electric service operations is presented in Table 1 below.

TABLE 1: ALR RECOMMENDATION - DOMINION ENERGY SOUTH CAROLINA, INC.
Docket No. 2020-125-E

	Capital Structure Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.00%	6.46%	3.23%
Common Equity	50.00%	8.63%	4.32%
Rate of Return	100.00%		7.55%

Exhibit ALR-2

Q. PLEASE SUMMARIZE HOW YOU DETERMINED YOUR 8.63% COST OF EQUITY RECOMMENDATION FOR DESC'S RETAIL ELECTRIC SERVICE OPERATIONS.

A. To arrive at my recommendations, I applied the Discounted Cash Flow Model ("DCF"), including a Constant Growth and a Non-Constant Growth method, to a proxy group of 36 publicly traded electric utility companies ("Electric Proxy Group") using data available through September 30, 2020. I also used a Capital Asset Pricing Model ("CAPM") analysis as a check on the reasonableness of the DCF indicated results.

[2] Using Dr. Vander Weide's capital structure of 53.35% common equity would result in a cost of capital of 7.25% to 7.72%.

My constant growth DCF model is used by major financial institutions. J.P. Morgan Chase uses the sustainable growth form of the DCF method, as I do, in its 2019 Long-Term Capital Market Assumptions publication.[3] *Principles of Corporate Finance*, a leading financial textbook used in business schools and investment banks around the world, recommends using the very same method I use to calculate the cost of equity for regulated energy utility companies.[4] As discussed in Section V.F. Capital Asset Pricing Model on page 46, my CAPM is based on methodologies used by Value Line, the Chicago Board of Options Exchange (CBOE), and published in peer-reviewed academic journals (e.g., The Review of Financial Studies).

I have determined the cost of equity for the average company in my Electric Proxy Group to be between 8.33% and 9.20%.[5] As shown in Table 2 below, the high-end results of my cost of equity models range between 8.00% and 10.12%, averaging 9.20%. The low-end results of my cost of equity models, including four variations of the CAPM, range between 7.94% and 8.66%, averaging 8.33%.

[3] 23rd Annual Edition, Long-Term Capital Market Assumptions - Time-tested projections to build stronger portfolios, pp. 62-63.
[4] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 86-87.
[5] Exhibit ALR-3.

TABLE 2: COST OF EQUITY MODEL RESULTS		
DCF	**Low**	**High**
Constant Growth	7.94%	8.00%
Non-Constant Growth	8.66%	8.87%
CAPM		
80.0% Market Confidence Level		
Risk Free Rate - 3-Month T Bill	8.10%	9.79%
Risk Free Rate - 30-Yr T Bond	8.61%	10.12%
Average	**8.33%**	**9.20%**

Exhibit ALR-3

Q. HOW DO CURRENT FINANCIAL MARKETS AFFECT YOUR COST OF EQUITY RECOMMENDATIONS?

A. It is always critical to consider the results of cost of equity models in the context of financial markets in general. It is particularly important to consider market data in the current economic environment because the spread of COVID-19 has drastically increased the speed and intensity of financial market change. Table 3 on page 6 shows a summary of how COVID-19 has impacted financial markets between December 31, 2019 and September 30, 2020. Line 1 of Table 3 shows how the overall stock market (S&P 500) sharply declined during the initial spread of COVID-19, but it has nearly fully recovered. Line 2 shows that interest rates have declined (30-year U.S. Treasury yields have fallen from 2.39% to 1.46%), but as shown on line 3 investors are demanding a credit spread to invest in riskier corporate bonds (77 basis point increase). Line 4 shows that investors' volatility expectations have increased significantly (13.78 to over 26.27) which indicates higher market risk. However, as shown on line 6, option-implied betas have decreased from 0.77 to 0.62 which indicates that investors expect electric utility stock price

movements to be less correlated with the overall market than before the pandemic and therefore less risky relative to the market. Line 5 shows that stock option prices indicate that the equity risk premiums have likely increased over that time-period which is consistent with the increase in credit-spreads shown on line 3. Table 3 below includes a much of the market data I use in my cost of equity models to estimate investors' actual return expectations.

TABLE 3: COST OF EQUITY IN TODAY'S FINANCIAL MARKET - SUMMARY
MEASURING COVID-19'S IMPACT ON THE COST OF EQUITY

	31-Dec	19-Feb	17-Mar	28-Apr	30-Jun	30-Sep	
	Pre-Crisis	COVID-19 Crisis					Dec '19 - Sep '20 Delta
		Mkt Peak	Trough	"Recovery"			
1. Stock Prices (S&P 500)	$3,230.78	$3,386.15	$2,529.19	$2,863.39	$3,100.29	$3,363.00	**$132**
2. Interest Rates (30-Yr) [1]	2.39%	2.01%	1.63%	1.20%	1.41%	1.46%	**-0.93%**
3. Credit Spreads (Baa vs. 10-Yr) [2]	1.98%	2.05%	3.49%	3.25%	2.93%	2.75%	**0.77%**
4. Volatility Expectations (30-Day) [3]	13.78	14.38	75.91	33.57	30.43	26.37	**19.79**
5. Market Risk Premium [4]	5.24%	5.18%	16.13%	10.64%	9.79%	7.49%	**2.26%**
6. Electric Proxy Group - Fwd. Beta (6-Mo.) [5]	0.77	0.74	0.33	0.77	0.76	0.62	**-0.15**

[1] 30-year U.S. Treasury Yield
www.treasury.gov
[2] Baa rated corporate bond yield - 10-year U.S. Treasury Yield
https://fred.stlouisfed.org/series/BAA
https://fred.stlouisfed.org/series/GS10
[3] VIX Index - 30 days
[4] Option-implied market risk premium vs. 30-year Treasury RFR - weighted across all traded expirations as of last Tuesday before date, annualized
[5] Option-implied beta - 6 month, as of last Tuesday before date
Exhibit ALR-5, page 3

See Section IV. COST OF EQUITY IN TODAY'S FINANCIAL MARKETS on page 13 for a more in-depth analysis of how the spread of COVID-19 has impacted financial markets and the cost of equity for electric utility companies.

Q. PLEASE COMPARE YOUR COST OF CAPITAL RECOMMENDATIONS TO DESC'S REQUESTED COST OF CAPITAL.

A. DESC's requested cost of capital is based on recommendations detailed in testimony provided by Dr. James H. Vander Weide of Financial Strategy Associates. Dr. Vander

Weide and I recommend a different cost of equity for DESC because we have fundamentally different analytical approaches. I focus on using market data (e.g. stock prices, bond yields, stock option prices) to measure investors' expectations as much as possible. On the other hand, Dr. Vander Weide relies almost exclusively on historical stock price returns and non-market data, including economists' interest rate forecasts and analysts earnings forecasts. Further, the market data that he uses in his cost of equity models is out of date. He does not use stock price data beyond May 2020. Notably the stocks in his proxy group have increased in price over 10% since May indicating that his cost of equity results are not representative of current market conditions and likely overstate DESC cost of equity.

The reasons I disagree with Dr. Vander Weide's 10.4% cost of equity recommendation in this proceeding include: (1) use of non-market data such as interest rate forecasts; (2) the growth rates applied in the Constant Growth DCF model; (3) the use of forecasted interest rates in his CAPM and Risk Premium Method; (4) the inclusion of a non-market-based model, the Comparable Earnings Method.

Q. IS DESC REQUESTING A 10.4% COST OF EQUITY AS RECOMMEND BY DR. VANDER WEIDE?

A. No. DESC is requesting a 10.25% cost of equity and an 8.48% rate of return.[6] According to Ms. Griffin's Direct Testimony, the Company believes that a 10.25% cost of equity "can be sufficient within the context of an order that is otherwise viewed by the rating agencies

[6] Griffin's Direct Testimony, page 10, Chart A.

and investment community as reasonable and supportive of the financial health of the Company."[7]

As shown in Table 4 below, I am recommending the same cost of debt (6.46%) as requested by DESC. My capital structure and cost of equity recommendations differ from what the Company is requesting, however. My 8.63% cost of equity recommendation results in a 7.55% overall rate of return. DESC's cost of equity recommendation results in an overall rate of return of 8.48%.

TABLE 4: COST OF CAPITAL COMPARISON

	Cost of Equity	Cost of Debt	Common Equity %	Debt %	Rate of Return
Rothschild Recommendation [1]	8.63%	6.46%	50.00%	50.00%	7.55%
DESC Request [2]	10.25%	6.46%	53.35%	46.65%	8.48%

[1] Exhibit ALR-2
[2] Company Filing, Exhibit C-7

As shown in Table 5 on page 9, if my cost of capital recommendations are used to set rates for DESC the rate of return portion of the revenue requirement will be about $521 million. On the other hand, if DESC's request (shown in Table 4 above) is used to set rates the annual revenue requirement will be about $598 million. If DESC's requested cost of capital is adopted instead of mine consumers will pay approximately $77 million more per year.

[7] Griffin's Direct Testimony, page 17, lines 8-11.

TABLE 5: ANNUAL REVENUE IMPACT COMPARISON - ROTHSCHILD AND DESC
($000s)

	Rate of Return Portion of Revenue Requirement	Difference DESC Rothschild
Rothschild	$ 520,913	
DESC Request	$ 598,049	**$ 77,136**

Inputs:

Based on following imputs: Rate Base (Proposed)*	$ 5,748,651
Federal income tax rate	21.0%
State income tax rate	5.0%

Mr. Coffer's Direct Testimony, Exhibit C-2, page 2 of 4, line 22.

Q. PLEASE PROVIDE A SUMMARY OF HOW DR. VANDER WEIDE'S COST OF EQUITY RECOMMENDATION COMPARES TO YOUR RECOMMENDATION, RETURN EXPECTATIONS OF MAJOR FINANCIAL INSTITUTIONS.

A. My direct testimony explains that Dr. Vander Weide's 10.4% cost of equity recommendation is above (1) return expectations indicated by market data (e.g., stocks, bonds, options) and (2) return expectations published by major financial institutions.

As shown in Table 6 on page 10, Dr. Vander Weide's 10.4% cost of equity recommendation is considerably higher than return expectations published by major banks and brokerage houses (7.1% to 8.1%).[8]

[8] Includes expected returns for "All Country World Equity" markets of 8.1%, which are higher than all domestic expectations.

TABLE 6: COST OF EQUITY COMPARISON	Nominal
Dr. Vander Weide's Recommendation (May 2020) [1]	10.4%
Charles Schwab - Long-Term Market Returns (March 2020) [2]	
U.S. Large Capitalization Stocks	7.1%
U.S. Small Capitalization Stocks	7.4%
J.P. Morgan Asset Management - Equity Long-Term Returns (March 2020) [3]	
U.S. Large Cap	7.2%
All Country World Equity	8.1%

Dates above indicate latest market-data used in analysis.

Sources:

[1] Dr. Vander Weide's Direct Testimony, page 48, line 15.

[2] Charles Schwab - Why Market Returns May Be Lower and Global Diversification More Important in the Future, June 23, 2020.

[3] J.P. Morgan Asset Management - LTCMA Market-to-Market: COVID-19 - New Cycle, New Starting Point, April 30, 2020.

The return expectations published by Charles Schwab and J.P. Morgan are based on their own financial models. I provide the data shown in Table 6 above to show that major financial institutions are telling their clients to expect lower returns on their investments than the cost of equity proposed by Dr. Vander Weide. Charles Schwab and J.P. Morgan's published return expectations of 7.1% to 8.1% are for the overall stock market. I would also note that my cost of equity recommendation of 8.63% is higher than the return expectations published by major banks and brokerage houses for small and large capitalization stocks trading in U.S. markets.

Dr. Vander Weide's cost of equity recommendation is for a regulated utility company. It is unlikely that investors would expect to earn a higher return on equity for a cost of service regulated utility company than for the overall stock market.

My 8.63% (8.19% - 9.07%) cost of equity for DESC is also on the high end of the range of the published figures shown in Table 6 above, which should give the Commission confidence that if my recommendation is used to set rates, it will still enable DESC to raise the capital it requires. The cost of equity cannot be calculated as precisely as the weight or height of an object. Therefore, I recommend a cost of equity of between 8.19% and 9.07%,

and the Commission can use the forecasts shown in Table 6 along with market data provided in this testimony to determine the cost of equity within that range which they consider appropriate for setting DESC's rates.

III. CAPITAL STRUCTURE AND COST OF DEBT

Q. WHAT CAPITAL STRUCTURE DO YOU RECOMMEND BE USED IN THIS CASE TO DETERMINE DESC'S OVERALL COST OF CAPITAL?

A. I recommend using a capital structure containing 50% common equity and 50% debt. My recommendation contains 3.35% less common equity than the 53.35% recommended by Company Witness Griffin. This is at the low end of the 50% to 55% range identified by the Commission as part of the merger between Dominion and SCANA.

Q. COMPANY WITNESS GRIFFIN SAYS THAT DESC HAS COMPLIED WITH THE TERMS OF THE MERGER AGREEMENT BY ACTUALLY BRINGING ITS CAPITAL STRUCTURE UP TO 53.35% EQUITY. PLEASE COMMENT ON THIS.

A. My concern is that while the Commission's directive on capital structure has not been specifically violated, its intent has been. The financial integrity of DESC is impacted by its common equity ratio. However, financial integrity is also impacted by the common equity ratio of its parent, Dominion Energy. As Ms. Griffin testifies on pages 3—4 of her testimony, Dominion Energy is committed to providing common equity to DESC with the intent of maintaining a strong credit matrix for DESC. What she has overlooked is that given the importance of the financial integrity of Dominion Energy to the financial integrity

of DESC, a change in either the capital structure of DESC or Dominion Energy impacts the financial integrity of DESC. Fortifying the common equity ratio of DESC while at the same time reducing the common equity ratio of Dominion is counterproductive.

Q. HAS THERE BEEN A SIGNIFICANT CHANGE IN THE COMMON EQUITY OF DOMINION ENERGY?

A. Yes. In the 2019 merger year, Value Line reports that Dominion Energy's common equity ratio increased from below 40% in prior years up to 45% by the end of 2019.[9] This increased common equity ratio combined with a reduction in Dominion Energy's business risk contributed to its bond rating upgrades earlier in 2020. However, Dominion is now in the process of repurchasing "…at least $3 billion…" of its common stock. Per the November 13, 2020 issue of Value Line, the common equity ratio of Dominion Energy is expected to go down to 42.5% by the end of this year, essentially because of these stock repurchases. Value Line further forecasts that Dominion Energy's common equity ratio will remain at 42.5% until the end of 2021 before eventually increasing to 47%, but not for a few years. Given Dominion's drop in its common equity ratio due to the stock repurchase and because of its impact on the credit worthiness of DESC, I recommend that the Commission compute DESC's overall cost of capital using a capital structure of no more than 50% common equity until Dominion Energy brings its common equity ratio more in line with the Commission's directive for DESC.

[9] Value Line, Dominion Energy, Inc. Company Report, November 13, 2020 (note: available on November 9, 2020).

Q. WHAT COST OF DEBT DO YOU RECOMMEND?

A. Dr. Vander Weide proposes using a cost of debt of 6.46%. I have used this rate in my analyses at this time. However, I am concerned because this cost rate is likely significantly above DESC's current cost of debt. Dominion Energy, Virginia Power and Dominion Energy Gas issued senior notes in 2019 with cost rates between 2.5% and 4.6%. DESC offered over $1 billion worth of First Mortgage Bonds in September 2019 with coupon rates ranging from 4.25% and 4.60%.[10] As of November 10, 2020, one of those first mortgage bonds (due on May 15 2049) offered in September 2019 has a market yield of 3.306%.[11] This recent trading data indicates that DESC's market-based cost of debt is significantly less than its requested 6.46% cost of debt.

IV. COST OF EQUITY IN TODAY'S FINANCIAL MARKETS

Q. HOW DOES YOUR COST OF EQUITY RECOMMENDATION RELATE TO THE CURRENT FINANCIAL MARKET?

A. The ongoing pandemic has fundamentally changed capital markets. It has increased uncertainly and as a result stock prices have been volatile. In the first half of March 2020, stock prices crashed, but by mid-August, the S&P 500 had already fully recovered, reaching a new high on August 18. Unemployment rates increased to over 10%, and economic growth is expected to slow or even shrink for the remainder of 2020 and possibly longer. In response, the Federal Reserve has cut short-term Treasury yields to 0% and Congress has passed a $2 trillion stimulus package. The Federal Reserve reported on

[10] https://news.dominionenergy.com/2019-09-12-Dominion-Energy-South-Carolina-Announces-Pricing-of-Tender-Offer

[11] Finra-markets.morningstar.com - Nov 10 2020 - DESC - 4.350% First Mortgage Bond Yield due 2049.

November 5, 2020 that the "Coronavirus pandemic poses considerable risks for the U.S. economy despite recent gains".[12]

During a financial crisis, many investors panic and sell shares in companies without regard for their economics. Others are forced to sell because of margin calls. Many unnerved investors purchase the safest (least risky) securities they can find, including treasury bonds and utility stocks, in a "flight-to-safety" response. All of these developments can impact the cost of equity

Q. HOW HAS THE RECENT FINANCIAL CRISIS IMPACTED THE COST OF EQUITY FOR ELECTRIC UTILITIES?

A. Electric utility stocks have been impacted along with the overall market. As shown in Chart 3 on page 18, the stocks in my Electric Proxy Group have underperformed the overall market since the pre-pandemic S&P-500 peak reached on February 19, 2020. The electric proxy group is down over 20% between February 19, 2020 and September 30, 2020 while the S&P 500 is down less than 1% over the same time period. The generally stable electricity demand in the United States is down 4.9% in April 2020 as compared to the same time last year.[13] However, not all utilities have been impacted to the same degree. Fitch Ratings (a credit rating agency) noted that some utilities can deal with this recession better than others. Moody's (another credit rating agency) expects "Dominion Ohio to be resilient to recessionary pressures related to the coronavirus because of its rate-regulated, essential service business model and cost recovery framework."[14]

[12] Fed Says Virus Poses Considerable Risks, Maintains Low-Rates Pledges, WSJ, November 5, 2020.
[13] Energy Information Association
[14] Rating Action: Moody's affirms Dominion and Dominion Energy Gas Holdings ratings; outlooks stable, 16 July 2020. https://www.moodys.com/research/Moodys-assigns-first-time-A2-senior-unsecured-rating-to-The--PR_425066

Q. PLEASE DISCUSS SOME OF CURRENT MARKET DEVELOPMENTS THAT IMPACT THE COST OF EQUITY.

A. Below I will discuss in more depth the data presented in Table 3 above. It is important to consider the results of my cost of equity models (DCF and CAPM) in the context of current financial market conditions as follows:

1. **Stock prices crashed and fully recovered.** The S&P 500, Dow Jones Industrial Average, and other stock indices fell faster in the second half of March 2020 than during the 2007-2008 financial crisis, the crash of 1987, or the Great Depression. As of March 23, 2020, the S&P 500 had fallen approximately 34% from its all-time high reached on February 19, 2020. On August 8, 2020, the S&P 500 set a new high which represents the fastest recovery (126 trading days) from a bear market. Electric utility stocks initially fell more than the overall market (about 36% off their peak versus 34% for the overall market). As of the end of September 30, 2020, electric utility stock prices have significantly lagged the overall market, but the stock price of DESC's parent, Dominion Energy, Inc., has outperformed the average return over the other 35 electric utilities covered by Value Line, down about 7% while its peers were down over 20%.

2. **Low interest rates and a steep yield curve.** As short-term Treasury yields reach 0%, long-term rates have dropped sharply as well. The difference between long-term and short-term yields, referred to as the yield curve, has increased. A steep yield curve (where long-term yields are significantly higher than short-term yields) indicates investors expect the economy to improve.

3. **Credit spreads increased sharply, declined, and remain elevated.** The spread between the yield investors demand to purchase U.S. Corporate bonds and U.S. Treasury bonds (see Chart 5 on page 21) increased significantly in the initial phases of the COVID-19 pandemic, but never got as high as it did during the financial crisis of 2007-2008. As of the end of September 30, 2020, the yield spread between Baa Corp bonds is about 2.75%. It reached a high of over 4.0% in March 2020.

4. Investors' stock price volatility expectations have fallen from highs reached during initial phases of the pandemic. In March 2020, the Market Volatility Index ("VIX") reached levels not seen since the financial crisis of 2007-2008, and even set all-time records. Volatility expectations remain higher than before COVID-19 but have declined significantly since peaks reached in March.

5. Market Risk Premiums. As discussed in the CAPM section below, stock option data indicates that the premium investors require to invest in stock has likely increased because volatility expectations have increased since the spread of the coronavirus.

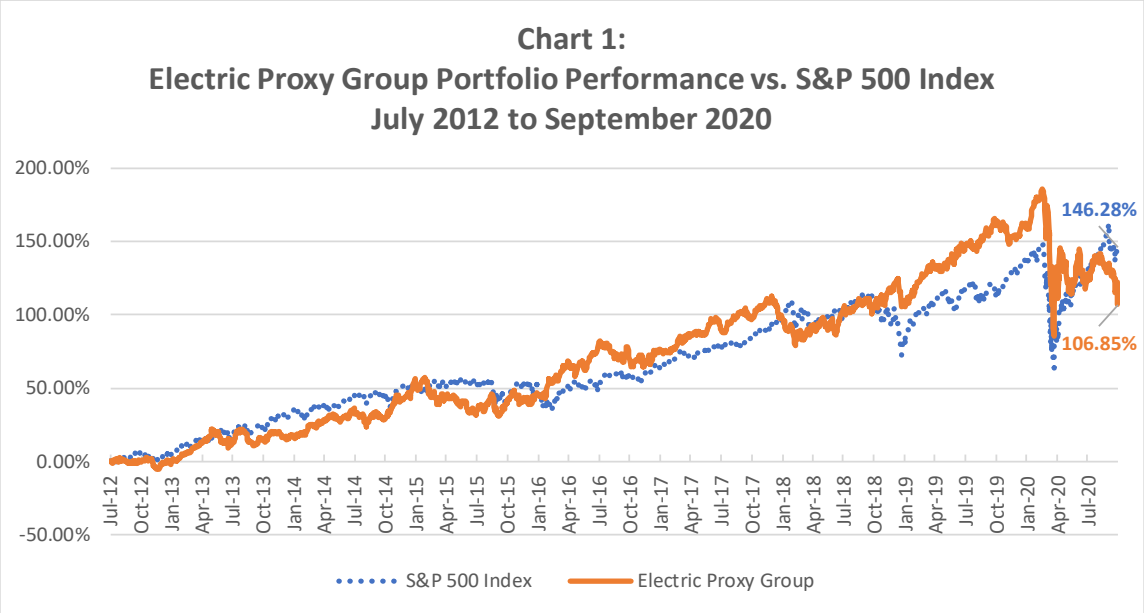
6. Electricity Group Forward 6-month Betas have decreased. As discussed in depth in the CAPM section below, stock option data indicates that investors expect electric utility stock price movements to be less correlated to the overall market. This development indicates that the cost of equity for electric utilities has been impacted less than the overall market.

A. Stock Price Trends

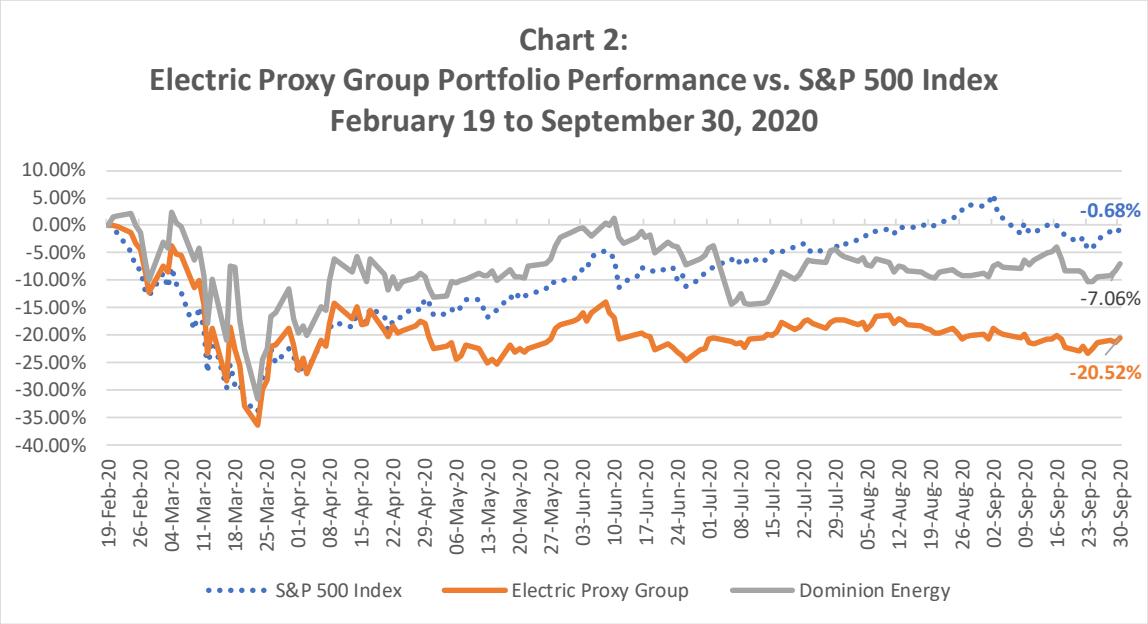
Q. WHAT, IF ANYTHING, DOES STOCK MARKET DATA INDICATE WITH REGARD TO THE COST OF EQUITY?

A. As stock prices have increased significantly in recent years, the price-to-earnings (P/E) ratios have increased as well. This indicates that the cost of equity may be decreasing along with the higher stock prices because investors are paying a higher price for the same earnings. For example, an investor paying $100 for a share of a stock with $10 per year of earnings will earn a 10% annual return, assuming no growth. If this stock goes up to $200 per share the annual earnings decreases to 5%. As shown in Chart 1 on page 18, until the recent COVID-19-related crash, stock prices for the S&P 500 and the Electric Proxy Group increased significantly in the more than eight years since DESC filed its last rate case on June 29, 2012.[15] At their peaks, the Electric Proxy Group had increased about 180% while the S&P 500 had increased only about 145%. Even considering the significant losses due to COVID-19, the Electric Proxy Group was up over 100% as of September 30, 2020. In comparison, the S&P 500 lost a lower percentage of its gains than the Electric Proxy Group in the recent market crash. As of September 30, 2020, the S&P 500 was 146.28% higher than it was as of June 29, 2012.

[15] Docket No. 2012-218-E.



Focusing on the drop in stock prices since the market's peak on February 19,2020 as of September 30, 2020, the Electric Proxy Group was down over 20% compared to less than 1% for the overall market, as shown in Chart 2 below.

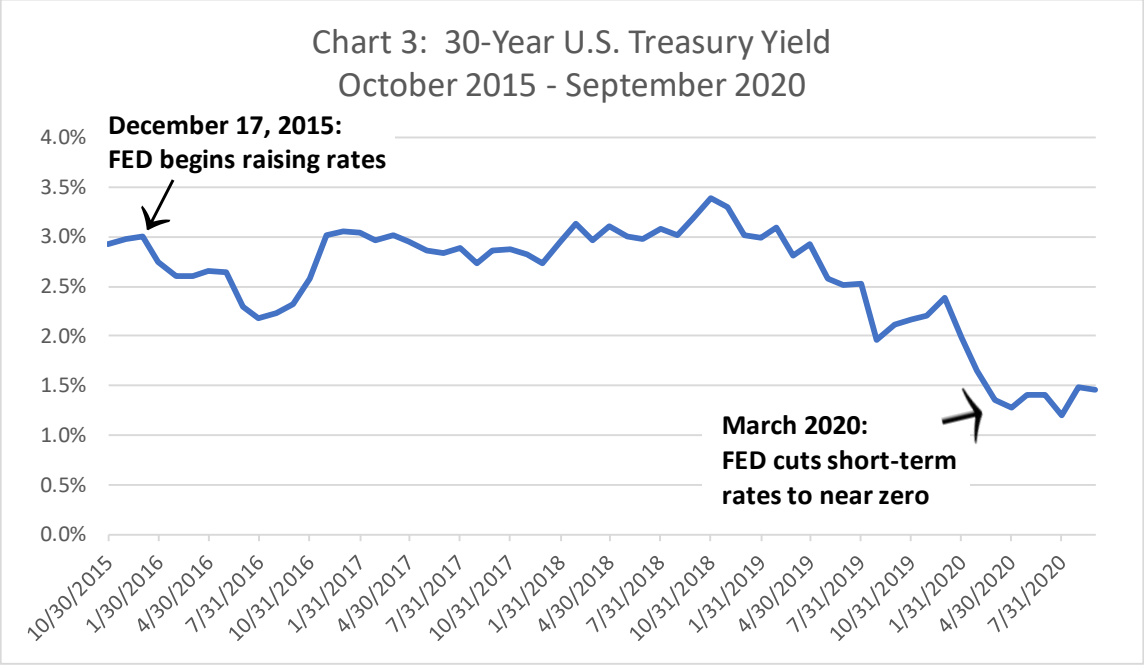


However, as shown in Chart 2 above, the stock price of Dominion Energy has significantly outperformed the average electric utility stock, down only about 7% since February 19, 2020.

B. Interest Rates

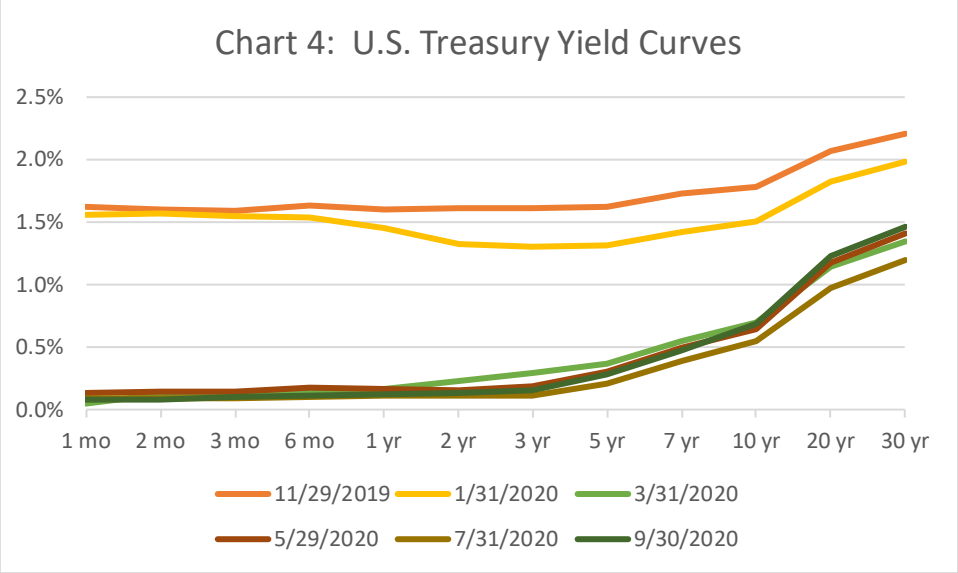
Q. PLEASE DISCUSS THE CURRENT INTEREST RATE ENVIRONMENT AND WHAT IT INDICATES REGARDING THE COST OF EQUITY.

A. There are two significant interest rate developments occurring in response to COVID-19. First, interest rates have fallen significantly. Short-term interest rates are near 0%. Starting in early March 2020, as shown on Chart 3 below, yields on 30-year U.S. Treasuries have fallen from about 2.30% at the beginning of 2020 to under 1.50%, on average. Federal Reserve officials pledged to support economic recovery by holding rates near zero for at least three years.[16] Lower interest rates indicate a lower cost of equity for electric utility companies because many bond investors sell bonds and purchase utility stocks as interest rates decline.



[16] Fed Says Virus Poses Considerable Risks, Maintains Low-Rates Pledges, WSJ, November 5, 2020.

The second development, as shown in Chart 4 below, is that the yield curve has steepened[17] significantly as a result of the Coronavirus-induced financial crisis.[18] Before the crisis, the yield on the 1-month Treasury bill was about 1.5%, increasing to less than 2.5% for the 30-year Treasury bond, which is less than a double. On the other hand, as of April 1, 2020, the yield curve increased from nearly 0% for the 1-month Treasury bill to about 1.25% for the 30-year U.S Treasury bond. A steep yield curve indicates investors expect economic conditions to improve because, with expected profitable investment opportunities, they require a significant premium in order to commit their money for long periods of time. On the other hand, when the yield curve is "flat" they do not require a premium to commit their money for long periods of time because they do not expect as many opportunities.



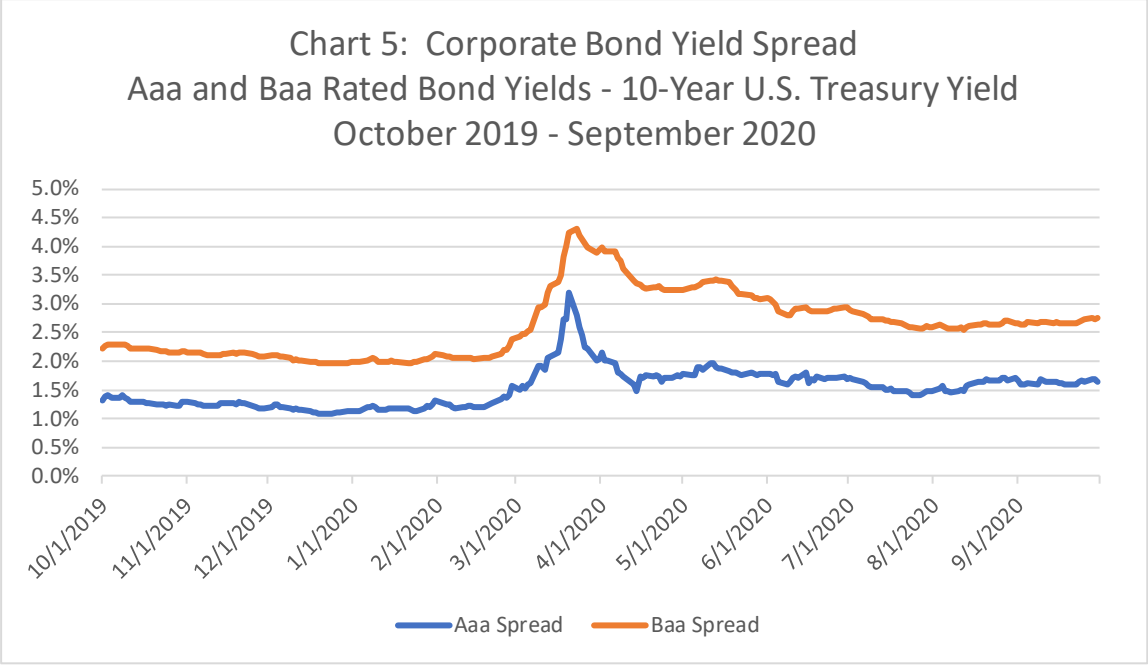
[17] The difference between short-and long-term interest rates is the slope of the yield curve. As this difference increases, the yield curve becomes steeper.

[18] The yield curve was even steeper for years (2009-2017) after the financial crisis of 2007-2008. It was relatively flat (short-term rates were about the same as long-term rates) for most of 2019 and early 2020 before the COVID-19 pandemic.

C. Increasing Credit Spreads

Q. WHAT DOES AN INCREASING CREDIT SPREAD MEAN FOR THE COST OF EQUITY?

A. As shown in Chart 5 below, the yield spread between Corporate bonds and Treasury bonds increased significantly as the Coronavirus has spread throughout the world. The interest rate spread between Baa Corp bonds and 10-year U.S. Treasuries peaked at over 4% mid-March. This chart clearly shows that yield spreads have declined since their peak. As of September 30, 2020, the yield spread between Baa Corp bonds and 10-year U.S. Treasuries is 2.75%, nearly 200 basis points lower than the peak reached in March 2020 and about 77 basis points higher than before the pandemic. A declining yield spread indicates that investors' appetite for risk has increased since mid-March 2020. As investors' appetite for risk increases the cost of equity tends to decline.



D. Volatility Expectations

Q. PLEASE DISCUSS CURRENT STOCK PRICE VOLATILITY EXPECTATIONS AND WHAT THEY INDICATE REGARDING THE COST OF EQUITY.

A. Volatility, uncertainty, and risk are synonymous. There are two primary types of volatility: "realized volatility" and "implied volatility." The former is based on historical returns which may or may not represent future volatility. For example, the current high volatility in the markets will most likely decrease after the spread of the Coronavirus is contained and people return to work. On the other hand, implied volatility is calculated from options data, which indicates investors' future expectations for volatility. As discussed below, the "term structure" of volatility indicates investors' volatility expectations over different forward-looking time periods (e.g., 1-month, 1-year).

Q. PLEASE EXPLAIN THE TERM STRUCTURE OF VOLATILITY.

A. Investors can expect volatility to increase or decrease in the future. During a crisis, investors often expect volatility to decrease in coming months or years. In other words, investors expect the current capital market hurricane to pass and the winds to die down. In general (i.e., in "normal" financial markets), investors expect higher volatility for longer time horizons. For example, investors generally expect the chance stock prices will increase or decrease by 10% in 1 year (on an annual basis) to be greater than the chance of a 10% move over the next 30 days (on an annual basis). This makes sense because there is more uncertainty regarding economic and stock market changes the further in the future you look out.

However, during the peak of implied volatility (to date) in mid-March 2020, shortly after the World Health Organization declared COVID-19 a pandemic, the data indicated

that investors expected stock price volatility to decrease over time (see Chart 8 on page 25). This implies that investors expected the riskiness of equity investments to decrease over time. As shown in Chart 6 below, before the COVID-19 outbreak, investors expected volatility to increase from less than 15% annually at the 1-month time frame to about 20% annually at the 31-month time frame. Post COVID-19 outbreak, investors expected volatility to decrease from over 70% at the 1-month time frame to about 33% at the 31-month time frame.

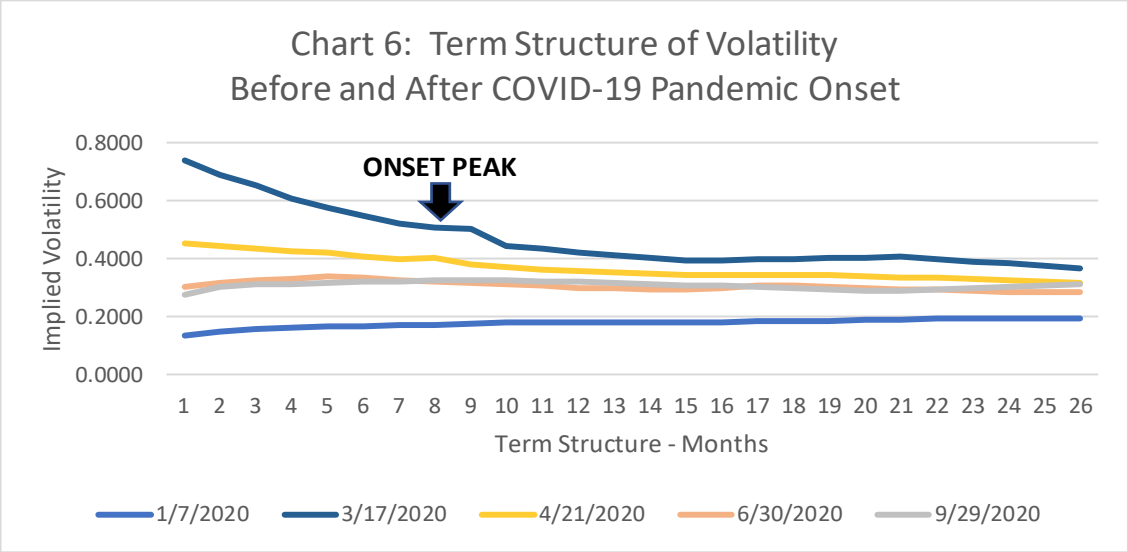
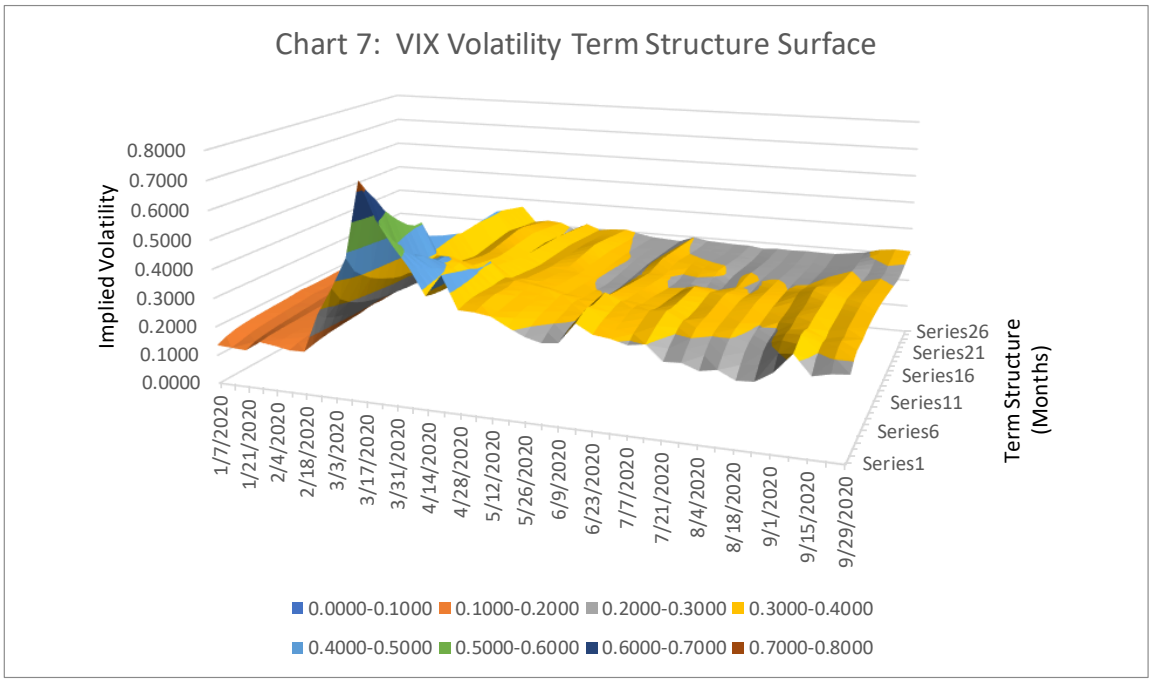


Chart 7[19] on page 24 provides a 3-dimensional surface to show how the term-structure of volatility has evolved since before the COVID-19 outbreak and how it has changed during the outbreak. One can see that on January 7th, the term structure of volatility is almost flat, increasing slightly from 1-month to the 32-month time frame. In mid-March 2020, the implied volatility increased over every time period in comparison to January 7th, but one can see that investors expected a declining term structure of volatility. By the end of July 2020, the implied volatility for all time periods had decreased, and the

[19] The X axis shows the implied volatility. The Y axis shows the data. The Z axis shows market expectation of future implied volatility of different time frames. Series1 = 1 month and Series31 = 31 months.

declining term structure moved to a more typical structure in which investors expected higher volatility over longer time periods.



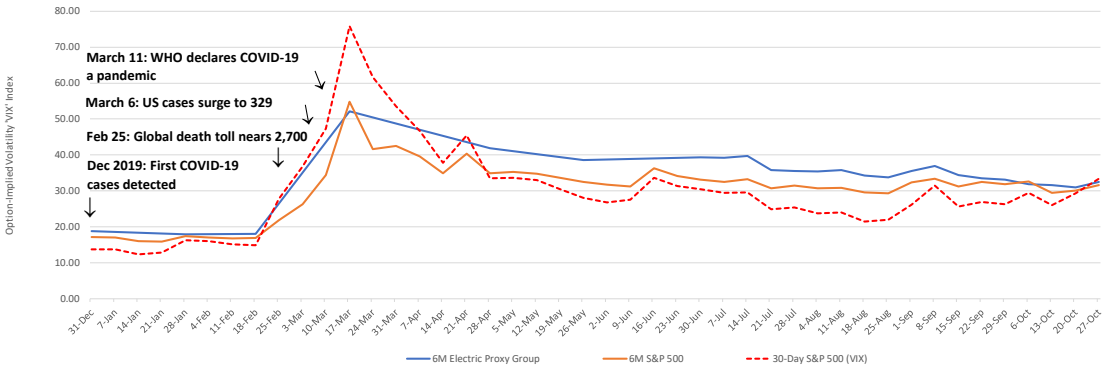
A declining term structure of volatility is important data to consider in determining the appropriate cost of equity for DESC because it shows that investors expected risk to decline during the peak (so far) of the pandemic's impact on financial markets. Lower risk means a lower cost of equity. Investors market volatility expectations turned out to be correct. Investors expected implied volatility to decline, and it did.

Q. HOW HAVE VOLATILITY EXPECTATIONS FOR ELECTRIC UTILITY COMPANIES COMPARED TO VOLATILITY EXPECTATIONS FOR THE S&P 500?

A. The dashed red line and the solid orange line in Chart 8 on page 25 show investors' stock price volatility expectations for the overall market (S&P 500) increased significantly as COVID-19 infections spread to the U.S. and continued to grow exponentially around the

world. The dashed red line and solid orange line show volatility expectations over the next 30 days and 6 months, respectively. In the middle of February 2020, investors expected an annualized change of about 13.00% over the next 30 days. In mid-March 2020, investors' volatility expectations peaked at over 80.00%. As of September 30, 2020, investors expected an annualized change of about 25.00%. The blue line in Chart 8 shows that investors' volatility expectations for my Electric Proxy Group, as indicated by their stock option prices, increased along with the market, but to a significantly lesser degree in mid-March 2020. Investors' volatility expectations for electric utility companies were higher than the overall market from April until mid-October. Considering that individual companies, and small portfolios of stocks, always have higher volatility than the overall market (as evidenced in the early part of the chart and explained below), this does not indicate that the cost of equity for electric utility companies has increased because of COVID-19.

Chart 8: Electric Proxy Group 6-Month 'VIX' Index
December 2019 through October 2020



Note that the implied volatility of electric utility companies is higher than the S&P 500 before the COVID-19 outbreak. The implied volatility for individual stocks and small groups of stocks is almost always higher than the overall market because of the effects of diversification. Therefore, the relative volatilities, pre-COVID-19, do not indicate that

electric utility companies are riskier than the S&P 500 and in fact accentuate even more the difference between the expected volatilities after the COVID-19 outbreak.

Q. HOW IS COVID-19 IMPACTING FINANCIAL MARKETS AND THE COST OF EQUITY FOR ELECTRIC UTILITY COMPANIES?

A. The spread of COVID-19 has caused a historical financial crisis. Yet, financial data indicates that the current capital market upheaval has not significantly impacted the cost of equity for electric utility companies. Investors know that electric utility companies provide an essential service that will be used and paid for even during a financial crisis.

Although stock and bond prices remain more volatile than before COVID-19, market data shows that investors' volatility expectations have declined for both the overall market and electric utility companies since mid-March 2020. Investors' volatility expectations are important, but as explained in my CAPM section on page 46, investors' expectations regarding the co-variance between electric utility stocks and the overall market are more relevant to cost of equity than volatility expectations alone. Option-implied betas indicate that investors expect electric utility stock price movements to be less correlated with the overall market than before the pandemic. As explained below, I use stock option data to calculate an "option-implied beta" which is a measurement to determine what investors' expectations are regarding the covariance between the expected returns for the Electric Proxy Group and for the S&P 500. In December 2019, the average option-implied beta for my Electric Proxy Group was approximately 0.77. As of September 30, 2020, the average option-implied beta of these 36 companies was 0.62. In other words, investors expect electric utility stocks to move only a little more than a half a percent for every percent the market moves. Before the pandemic, investors expected that

electric utility stocks would move about 0.77% for every 1.0% move. Declining electric utility option-implied betas indicates that investors understand that electric utility companies provide an essential service that will be relatively unimpacted by the overall economy. This also indicates that the cost of equity for electric utility companies has not increased and possibly even declined since before the pandemic.

Every financial crisis is unique, and this one is no exception. But it seems that, as has been the case during financial crises in the past, investors do not require a higher cost of equity for electric utility companies despite the current market turbulence.

V. COST OF EQUITY CALCULATION

A. Overview

Q. PLEASE PROVIDE YOUR DEFINITION OF THE COST OF CAPITAL.

A. The cost of capital is the return investors require to provide capital to DESC based on current capital markets. The spread of COVID-19 has made it more challenging to determine the current cost of capital because it has drastically increased the speed and intensity of capital market change. In order to measure the cost of equity accurately during rapid change, it is critical to use current market data. Because of the current financial crisis, it is particularly important to consider model results in the context of extreme financial turbulence. In order to do this, it is critical to consider how model results change over time throughout this crisis.

My cost of equity ("COE") recommendation is my opinion of the return investors require to provide equity capital to DESC based on current capital markets. My

recommendation is consistent with the following legal standards set by the United States Supreme Court for a fair rate of return:

> The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[20]

And

> …sufficient to…support its credit and…raise the money necessary for the proper discharge of its public duties.[21]

Because the cost of equity is not a published figure like a bond yield, some interpretation is required to determine the appropriate market price. My cost of equity recommendation is based on my computation of what the market indicates investors require (return on investment) to provide capital to companies with comparable risk to DESC.

As explained below, I use current market prices (e.g. stocks, bonds, options), which measures investors' expectations directly, instead of relying solely on historical data and analyst forecasts.

A cost of equity based on market prices (market-based) is superior to a cost of equity based on historical data (non-market-based) for two reasons:

1. The cost of equity that DESC has to pay investors is based on capital markets. Interest rates remain at historical low levels after a persistent downtrend since the early 1980s. It is possible interest rates will increase, but if the marketplace expected interest rates to change, then that would already be part of current prices.

[20] Federal Power Commission v. Hope Natural Gas Company 320 U.S. 591, 603. (1944)
[21] Bluefield Water Works & Improvement Company v. Public Service Commission of the State of West Virginia 262 U.S. 679, 692-693 (1923).

2. Capital markets are unpredictable. Regarding capital markets' unpredictability, investment guru Warren Buffet recently gave the following advice to investors:

> They should not listen to a lot of the jabbering about what the market is going to do tomorrow, or next week or next month because nobody knows.[22]

Current capital markets are our best source of investors' expectations regarding future capital markets. Current market prices of stocks and bonds reflect investors' forecasts for long-term interest rates and capital markets in general. If, indeed, investors in the aggregate should be expecting an increase in interest rates, adding a separate factor for this on top of what is already indicated in market prices would amount to a double-count.

Q. HOW DID YOU ARRIVE AT YOUR COST OF EQUITY RECOMMENDATIONS?

A. To arrive at my recommendations, I applied the Discounted Cash Flow Model ("DCF"), including a Constant Growth and a Non-Constant Growth method and a Capital Asset Pricing Model ("CAPM") analysis to a group of similar companies (Electric Proxy Group) using data available through September 30, 2020 as discussed below.

[22] PBS News Hour, June 26, 2017, Part 1 – America should stand for more than just wealth, says Warren Buffett.

B. Proxy Group Selection

Q. WHICH COMPANIES DID YOU INCLUDE IN YOUR COMPARABLE PROXY GROUP TO DETERMINE YOUR COST OF EQUITY RECOMMENDATION?

A. I chose to include the same 36 publicly traded electric utility companies used by Dr. Vander Weide in my comparable proxy group, referred to as the Electric Proxy Group. These 36 companies are listed on Table 7 on page 30.

TABLE 7: ELECTRIC PROXY GROUP COMPOSITION

	Company Name	Ticker
1	AMEREN	AEE
2	AMERICAN ELEC. PWR.	AEP
3	AVANGRID, INC.	AGR
4	ALLETE	ALE
5	AVISTA CORP.	AVA
6	BLACK HILLS CORP.	BKH
7	CMS ENERGY CORP.	CMS
8	CENTER POINT EN'RGY	CNP
9	DOMINION ENERGY, INC.	D
10	DTE ENERGY CO.	DTE
11	DUKE ENERGY	DUK
12	CON. EDISON	ED
13	EDISON INTERNAT'L	EIX
14	EVERSOURCE ENERGY	ES
15	ENTERGY CORP.	ETR
16	EVERGY, INC.	EVRG
17	EXELON CORP.	EXC
18	FIRST ENERGY	FE
19	FORTIS, INC.	FTS.TO
20	HAWAIIAN ELECTRIC	HE
21	IDACORP, INC.	IDA
22	ALLIANT ENERGY	LNT
23	MGE ENERGY INC.	MGEE
24	NEXTERA ENERGY	NEE
25	NORTHWESTERN	NWE
26	OGE ENERGY CORP.	OGE
27	OTTERTAIL CORP.	OTTR
28	P.S. ENTERPRISE GP.	PEG
29	PNM RESOURCES	PNM
30	PINNACLE WEST	PNW
31	PORTLAND GENERAL	POR
32	PPL CORPORATION	PPL
33	SOUTHERN COMPANY	SO
34	SEMPRA ENERGY	SRE
35	WEC ENERGY GROUP	WEC
36	XCEL ENERGY	XEL

C. Discounted Cash Flow

Q. HOW DID YOU ARRIVE AT YOUR DCF-BASED COST OF EQUITY RECOMMENDATION?

A. I used both the constant growth form of the Discounted Cash Flow ("DCF") method, which determines growth based on the sustainable retention growth procedure, and a non-constant DCF method. My constant growth form DCF analysis indicates a cost of equity range of between 7.94% and 8.00% for the Electric Proxy Group.[23] The results of my non-constant DCF method indicates a cost of equity of between 8.66% and 8.87% for the Electric Proxy Group.[24]

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The DCF method, is an approach to determining the cost of equity. The method recognizes that investors purchase common stock to receive future cash payments. These payments come from: (a) current and future dividends, and (b) proceeds from selling stock. A rational investor will buy stock to receive dividends and to ultimately sell the stock to another investor at a gain. The price the new owner is willing to pay for stock is related to that buyer's expectation of future flow of dividends and the future expected selling price. The value of the stock is the discounted value of all future dividends until the stock is sold plus the value of proceeds from the sale of the stock.

[23] See Exhibit ALR-4, page 1.
[24] See Exhibit ALR-4, page 2 and Exhibit ALR-4, page 3.

Q. HAVE INVESTORS ALWAYS USED THE DCF METHOD?

A. While investors who buy stock have always done so for future cash flow, the DCF approach first appeared in the 1937 Harvard Ph.D. thesis of John Burr Williams titled *The Theory of Investment Value*. Author Peter L. Bernstein once stated, Williams' model for valuing a security calls for the investor to make a long-run projection of a company's future dividend payments…"[25] The Williams DCF model separately discounts each and every future expected cash flow. Dividends and proceeds from the sale of stock are the expected cash flows. Its accuracy is therefore unaffected by non-constant growth rates. Myron Gordon and Eli Shapiro who helped to make this method widely used, referred to Williams' work in their paper published in 1956 "Equipment Analysis: The Required Rate of Profit."

D. Constant Growth Form of the DCF Model

Q. YOU STATE YOU USED THE CONSTANT GROWTH FORM OF THE DCF MODEL. WHAT IS THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. The constant growth form of the DCF model is a form of the DCF method that can be used in determining the cost of equity when investors can reasonably expect that the growth of retained earnings and dividends will be constant.

Retained earnings are funds that a company keeps in its treasury, so that they are available for future needs, such as operating expenses, capital expenditures, debt payments, and new investments. These retained earnings show investors whether the company is

[25] P. BERNSTEIN, *Capital Ideas: The Improbable Origins of Modern Wall Street* (The Free Press, © 1992).

growing which, in turn, is a measure of the future indicator of dividends and the value of a company's stock.

Q. DESCRIBE HOW THE CONSTANT GROWTH MODEL WORKS.

A. The constant growth model is described by this equation k= D/P + g, where: [26]

k= cost of equity;
D=Dividend; and
P=Market price of stock at time of the analysis.

and where:

g=the growth rate, where g= br + sv;
b=the earnings retention rate;
r=return on common equity investment (referred to below as "book equity");
v=the fraction of funds raised by the sale of stock that increases the book value of the existing shareholders' common equity; and
s=the rate of continuous new stock financing.
The constant growth model is therefore correctly recognized to be:
k=D/P + (br +sv)

The cost of equity demanded by investors is the sum of two factors. The first factor is the dividend yield. The second factor is growth (dividends and stock price). The logical relationship among these factors is as follows: the dividend yield is calculated based on current dividend payments while growth indicates what dividends and stock price will be in the future.

Q. WHAT OTHER FACTORS IMPACT HOW ONE USES THE CONSTANT GROWTH FORM OF THE DCF MODEL?

A. Sufficient care must be taken to be sure that the growth rate "g" is representative of the constant sustainable growth. To obtain an accurate constant growth DCF result, the

[26] M. GORDON, *Cost of Capital to a Public Utility*, at 32-33 (MSU Public Utility Studies 1974).

mathematical relationship between earnings, dividends, book value and stock price must be respected.

Suppose one is faced with a situation where Value Line forecasts of growth are being used as a source for inputs and Value Line projects different growth rates for earnings per share and dividends per share. Under such conditions, the earnings per share growth rate does not provide a reasonable proxy for earnings per share growth, and dividends per share and stock price growth as well. Consider the following:

1. It is the lower dividend growth rate that makes it possible for more earnings to be retained, which in turn makes the earnings per share growth rate higher than it would be if dividends had in fact been modeled by Value Line to keep pace with earnings per share growth.
2. A dividend growth rate that is lower than both the earnings per share growth rate and the stock price growth rate means that the dividend yield will be going down. However, the constant growth form of the DCF model has no mechanism to account for the lower dividend yield investors would get if the Value Line projections were correct.

Using an earnings per share growth rate in the constant growth form of the DCF model will therefore result in an overstatement of the cost of equity whenever the earnings per share growth rate that has been modeled is derived along with an expectation of a lower dividend growth rate. This is because, under these conditions, the dividend yield portion of the constant growth form of the equation will be overstated.

The basic difference between the use of an analysts' earnings per share growth rate in the constant growth DCF formula and using the "br" (**b** (the earnings retention rate) X **r**

(rate of return on common equity investment)) approach is that the "br" form, if properly applied, eliminates the mathematical error caused by an inconsistency between the expectations for earnings per share growth and dividends per share growth. Because it eliminates that error, the results of a properly applied "br" approach will be superior to the answer obtained from other approaches to the constant growth form of the DCF model. This is not to say that even a properly applied "br" approach will be perfect. The self-correcting nature of a properly applied "br" to forecasted differences in earnings per share and dividends per share growth rates helps mitigate the resultant error, but should not be viewed as the perfect way to quantify the impact of expected non-constant growth rates.

Q. ARE YOU AWARE OF CLAIMS ALLEGING THAT THE "BR" APPROACH TO THE CONSTANT GROWTH DCF MODEL IS FLAWED BECAUSE IT RELIES ON THE VALUE OF THE FUTURE EXPECTED RETURN ON BOOK EQUITY "R" TO ESTIMATE WHAT THE EARNED RETURN ON EQUITY SHOULD BE?

A. Yes. One common criticism is that it is not reasonable for the DCF to indicate a cost of equity (market return) that is different (lower or higher) than the expected return on book equity (accounting). There are multiple reasons why this concern is unfounded:

1. The constant growth form of the equation using "br" is:

$$k = D/P + (br + sv).$$

In this equation, "k" is the variable for the cost of equity, and "r" is the future expected return on equity. The cost of equity, "k," is not the same variable as the future expected earned return on equity, "r." In fact, there often is a large difference between the two.

2. The correct value to use for "r" is the return on book equity expected by investors as of the time the stock price and dividend data is used to quantify the D/P term in the equation. Therefore, even if future events occur that may change what investors expect for "r," the computation of the cost of equity "k" remains correct as of the time the computation was made.

3. The ability of a commission's ROE decision to influence future cash flow expectations is not unique to the retention growth DCF approach. The five-year analysts' earnings per share growth rate is a computation that is directly influenced by what earnings per share will be in five years. Allowed ROE's impact earning – higher allowed returns lead to higher earnings growth because the higher allowed returns the more earnings that are available for reinvestment.

Q. CAN CHANGES IN THE ACTUAL EARNED RETURNS IMPACT GROWTH ABOVE AND BEYOND WHATEVER GROWTH RESULTS FROM EARNINGS RETENTION?

A. Yes, but large short-term changes in earnings per share caused by a perceived change in the future expected earned returns are unsustainable. The new perceived earned return on book equity should be part of the computation, but the one-time growth spurt to get there is no more indicative of the sustainable growth required in the constant growth DCF formula than the temporary negative growth that occurs when a company has a bad year.

Q. HOW HAVE YOU IMPLEMENTED THE CONSTANT GROWTH FORM OF THE DCF MODEL IN THIS CASE?

A. I have applied the constant growth form of the DCF model by staying true to the mathematically derived "k=D/P + (br + sv)" form of the DCF model. I have also taken care to fully allocate all future expected earnings to either future cash flow in the form of dividends ("D") or to retained earnings (the retention rate, "b"). This extra accuracy is obtained only when the retention rate "b" is derived from the values used for "D" and "r," rather than independently.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE VALUES YOU USED IN THE CONSTANT GROWTH FORM OF THE DCF METHOD.

A. The DCF model generally calls for the use of the dividend expected over the next year. A reasonable way to estimate next year's dividend rate is to increase the quarterly dividend rate by ½ of the current actual quarterly dividend rate. This is a good approximation of the rate that would be obtained if the full prior year's dividend were escalated by the entire growth rate.[27]

I obtained the stock price—"P"—used in my DCF analysis from the closing prices of the stocks on September 30, 2020. I also obtained an average stock price for the 12 months ending September 30, 2020 by averaging the high and low stock prices for the year.

[27] For example, assume a company paid a dividend of $0.50 in the first quarter a year ago, and has a dividend growth rate of 4 % per year. This dividend growth rate equals (1.04)^4-1=0.00985 % per quarter. Thus, the dividend is $0.5049 in the second quarter, $0.5099 in the third quarter, and $0.5149 in the fourth quarter. If that 4 % per annum growth continues into the following year, then the dividend would be $0.5199 in the 1st quarter, $0.5251 in the 2nd quarter, $0.5303 in the 3rd quarter, and $0.5355 in the 4th quarter. Thus, the total dividends for the following year equal $2.111 (0.5199 + 0.5251 + 0.5303 + 0.5355). I computed the dividend yield by taking the current quarter (the $0.5149 in the 4th quarter in this example) and multiplying it by 4 to get an annual rate of $2.06. I then escalated this $2.06 by ½ the 4 % growth rate, which means it is increased by 2 %. $2.06 x 1.02= $2.101, which is within one cent of the $2.111 obtained in the example.

I based the value of the future expected return on equity— "r" —on the average return on book equity expected by Value Line, adjusted in consideration of recent returns. I also made a computation that was based on a review of both the earned return on equity consistent with analysts' consensus earnings growth rate expectations and on the actual earned returns on equity. For a stable industry such as utility companies, investors will typically look at actual earned returns on equity as one meaningful input into what can be expected for future earned returns on book equity. See Exhibit ALR-4, page 1.

This return on book equity expectation used in the DCF method to compute growth must *not* be confused with the cost of equity. Since the stock prices for the comparative companies are substantially higher than their book value, the return investors expect to receive on their market price investment is considerably less than the anticipated return on book value. If the market price is low relative to book value, the cost of equity will be higher than the future expected return on book equity, and if the market price is high, then the return on book equity will be less than the cost of equity.

In addition to growing through the retention of earnings, utility companies also grow by selling new common stock. Selling new common stock increases a company's growth. I quantified this growth caused by the sale of new common stock by multiplying the amount that the actual market-to-book ratio exceeds 1.0, by the compound annual growth rate of stock that Value Line forecasts. The results of that computation are shown on line 4 of Exhibit ALR-4, page 1.

Pure financial theory prefers concentrating on the results from the most current price because investors cannot purchase stock at historical prices. There is a legitimate concern, however, about the potential distortion of using just a single price. I present DCF

results based on the most recent stock pricing data (September 30, 2020) as well as the average of the high and low stock price over the past 12 months to obtain a range of reasonable values. As shown in Exhibit ALR-4, page 1, the DCF result based on the average of the high and low stock price for the year ending September 30, 2020 is 7.94%. The DCF result based on the stock price as of September 30, 2020 is 8.00%. Exhibit ALR-4, page 1, shows more of the specifics of how I implemented the constant growth form of the DCF model for the Electric Proxy Group.

Q. PLEASE EXPLAIN HOW YOU DETERMINED WHAT VALUE TO USE FOR "R" WHEN COMPUTING GROWTH IN YOUR CONSTANT GROWTH FORM OF THE DCF MODEL.

A. The inputs I considered are shown in Footnote [C] of Exhibit ALR-4, page 1. The value of "r" that is appropriate to use in the DCF formula is the value anticipated by investors to be maintained on average in the future. This Exhibit shows that the average future return on equity forecasted by Value Line for the Electric Proxy Group between 2020 and 2023-25 is 10.06%. The same footnote also shows that the future expected return on equity derived from the Zacks consensus forecast is 9.79%, and that the actual returns on equity earned by the Electric Proxy Group on average were 10.66% in 2017, 9.97% in 2018, and 10.26% in 2019. Based on the combination of the forecasted return on equity derived from the Zacks consensus, the recent historical actual earned returns, and Value Line's forecast, I made the DCF growth computation using a 10.00%[28] value of "r".

[28] I used 10.00% in consideration of historical returns, allowed returns, and Value Line projected returns for the Electric Proxy Group.

Q. WHAT COST OF EQUITY IS INDICATED BY THE CONSTANT GROWTH FORM OF THE DCF METHOD THAT YOU RELY ON FOR YOUR RECOMMENDATION?

A. The result of my DCF analysis using the Constant Growth form of the DCF indicates a cost of equity range of between 7.94% and 8.00% for the Electric Proxy Group.[29] Since these DCF findings use analysts' forecasts to derive sustainable growth (in part) and on analysts' forecasts of dividend growth and book value growth in the non-constant form of the DCF method, the results should be considered as conservatively high. This is because, as previously mentioned above, analysts' forecasts of such growth have been notoriously overstated.

My results are not as influenced by over-optimistic analysts' forecasts as would have been the case had I merely used analysts' five-year earnings growth rate forecasts as a proxy for long-term growth. This is because the DCF methods I use compute sustainable growth rates, rather than growth rates that can exaggerate the growth rate due to assuming that a relatively short-term forecast (five-years) will remain indefinitely.

E. Non-Constant Growth Form of the DCF Model

Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE NON-CONSTANT GROWTH FORM OF THE DCF MODEL.

A. The non-constant growth form of the DCF model determines the return on investment expected by investors based on an estimate of each separate annual cash flow the investor expects to receive. For the purpose of this computation, I have incorporated Value Line's

[29] Exhibit ALR-4, page 1.

detailed annual forecasts to arrive at the specific non-constant growth expectations that an investor who trusts Value Line would expect. This implementation is shown on Exhibit ALR-4, page 2 and Exhibit ALR-4, page 3. In the first stage, cash flow entry is the cash outflow an investor would experience when buying a share of stock at the market price. The subsequent years of cash flow are equal to the dividends per share that Value Line forecasts. For the intermediate years of the forecast period in which Value Line does not provide a specific dividend, the annual dividends were obtained by estimating that dividend growth would persist at a compound annual rate. The cash flow at the end of the forecast period consists of both the last year's dividend forecast by Value Line, and the proceeds from the sale of the stock. The stock price used to determine the proceeds from selling the stock was obtained by estimating that the stock price would grow at the same rate at which Value Line forecasts book value to grow.

Q. WHY DID YOU USE BOOK VALUE GROWTH TO PROVIDE THE ESTIMATE OF THE FUTURE STOCK PRICE?

A. For any given earned return on book equity, earnings are directly proportional to the book value. Furthermore, book value growth is the net result after the company produces earnings, pays a dividend and also, perhaps, either sells new common stock at market price or repurchases its own common stock at market price.

Once these cash flows are entered into an Excel spreadsheet, the compound annual return an investor would achieve as a result of making this investment was obtained by using the Internal Rate of Return (IRR) function built into the spreadsheet. As shown on Exhibit ALR-4, page 2 and Exhibit ALR-4, page 3, this multi-stage DCF model produced an average indicated cost of equity of 8.66% based on the year-end stock price, and 8.87%

based on average prices for the year ending September 30, 2020 for the Electric Proxy Group.

Q. YOUR NON-CONSTANT GROWTH DCF MODEL USES ANNUAL EXPECTED CASH FLOWS. SINCE DIVIDENDS ARE PAID QUARTERLY RATHER THAN ANNUALLY, HOW DOES THIS SIMPLIFICATION IMPACT YOUR RESULTS?

A. I used the annual model because it is easier to input the data and for observers to visualize what is happening. By modeling cash flows to be annual rather than when they are actually expected to occur causes a small overstatement of the cost of equity.

Q. WHY IS IT A SMALL OVERSTATEMENT OF THE COST OF EQUITY IF YOU HAVE MODELED DIVIDENDS TO BE RECEIVED SOME MONTHS AFTER INVESTORS ACTUALLY EXPECT TO RECEIVE THEM?

A. The process of changing from an annual model to a quarterly model would require two changes, not just one. A quarterly model would show dividends being paid sooner and would also show earnings being available sooner. A company that receives its earnings sooner, rather than at the end of the year, has the opportunity to compound them. Since revenues, and therefore earnings, are essentially received every day, a company that is supposed to earn an annual rate of 9.00% on equity would have to earn only 8.62% if the return were compounded daily.[30] This reduction from 9.00% to 8.62% would then be partially offset by the impact of the quarterly dividend payment to bring the result of switching from the simplifying annual model closer to, but still a bit below 9.00%.

[30] (1+.0862/365)^365=1.09=9.00 %.

Q. BY USING CASH FLOW EXPECTATIONS AS THE VALUATION PARAMETER, DOES THE NON-CONSTANT DCF MODEL STILL RELY ON EARNINGS?

A. Yes. It relies on an expectation of future cash flows. Future cash flows come from dividends during the time the stock is owned and capital gains from the sale of the stock once it is sold. Since earnings impact both dividends and stock price, the non-constant DCF model still relies on earnings.

Every dollar of earnings is used for the benefit of stockholders, either in the form of a dividend payment, or earnings reinvested for future growth in earnings and/or dividends. Earnings paid out as a dividend have a different value to investors than earnings retained in the business. Recognizing this difference and properly considering it in the quantification process is a major strength of the DCF model, and is why the non-constant DCF model as I have set forth is an improvement over either the price-to-earnings ratio (P/E ratio) or dividend/price (D/P) methods. Comparing the P/E ratios and the dividend yield (D/P) are helpful as a rule of thumb, but they must be used with caution because, among other reasons, two companies with the same dividend yield can have a different cost of equity if they have different retention rates. A DCF model is more reliable than these rules of thumb because it can account for different retention rates, among other factors.

Q. WHY IS THERE A DIFFERENCE TO INVESTORS IN THE VALUE OF EARNINGS PAID OUT AS A DIVIDEND COMPARED TO THE VALUE OF EARNINGS RETAINED IN THE BUSINESS?

A. The return on earnings retained in the business depends upon the opportunities available to that company. If a regulated utility reinvests earnings in needed used and useful utility assets, then those reinvested earnings have the potential to earn at whatever return is

consistent with ratemaking procedures allowed and the skill of management in prudently operating the system.

When an investor receives a dividend, he can either reinvest it in the same or another company or use it for other things, such as paying down debt or paying living expenses. Although an investor could theoretically use the proceeds from any dividend payments to simply buy more stock in the same company, when an investor increases her investment in a company by purchasing more stock, the transaction occurs at market price. However, when the same investor sees her investment in a company increase because earnings are retained rather than paid as a dividend, the reinvestment occurs at book value. Stated within the context of the DCF terminology: earnings retained in the business earn at the future expected return on book equity "r," and dividends used to purchase new stock earn at the rate "k." When the market price exceeds book value (that is, the market-to-book ratio exceeds 1.0), retained earnings are worth more than earnings paid out as a dividend because "r" will be higher than "k." Conversely, when the market price is below book value, "k" will be higher than "r," meaning that earnings paid out as a dividend earn a higher rate than retained earnings.

Q. IF RETAINED EARNINGS WERE MORE VALUABLE WHEN THE MARKET-TO-BOOK RATIO IS ABOVE 1.0, WHY WOULD A COMPANY WITH A MARKET-TO-BOOK RATIO ABOVE 1.0 PAY A DIVIDEND RATHER THAN RETAIN ALL OF THE EARNINGS?

A. Retained earnings are more valuable than dividends only if there are sufficient opportunities to profitably reinvest those earnings. Regulated utility companies are allowed to earn the cost of capital only on assets that are used and useful in providing utility

service. Investing in assets that are not needed may not produce any return at all. For unregulated companies, opportunities to reinvest funds are limited by the demands of the business. For example, how many new computer chips can Intel profitably develop at the same time?

Q. UNDER THE NON-CONSTANT DCF MODEL, IS IT NECESSARY FOR EARNINGS AND DIVIDENDS TO GROW AT A CONSTANT RATE FOR THE MODEL TO BE ABLE TO ACCURATELY DETERMINE THE COST OF EQUITY?

A. No, because the non-constant form of the DCF model separately discounts each and every future expected cash flow, it does *not* rely on any assumptions of constant growth. The dividend yield can be different from period to period, and growth can bounce around in any imaginable pattern without harming the accuracy of the answer obtained from quantifying those expectations. When the non-constant DCF model is correctly used, the answer obtained is as accurate as the estimates of future cash flow.

Q. WHAT COST OF EQUITY DOES YOUR NON-CONSTANT GROWTH DCF METHOD INDICATE?

A. My non-constant growth DCF method indicates a cost of equity of between 8.66% and 8.87%.[31]

[31] Exhibit ALR-4, page 2 and Exhibit ALR-4, page 3.

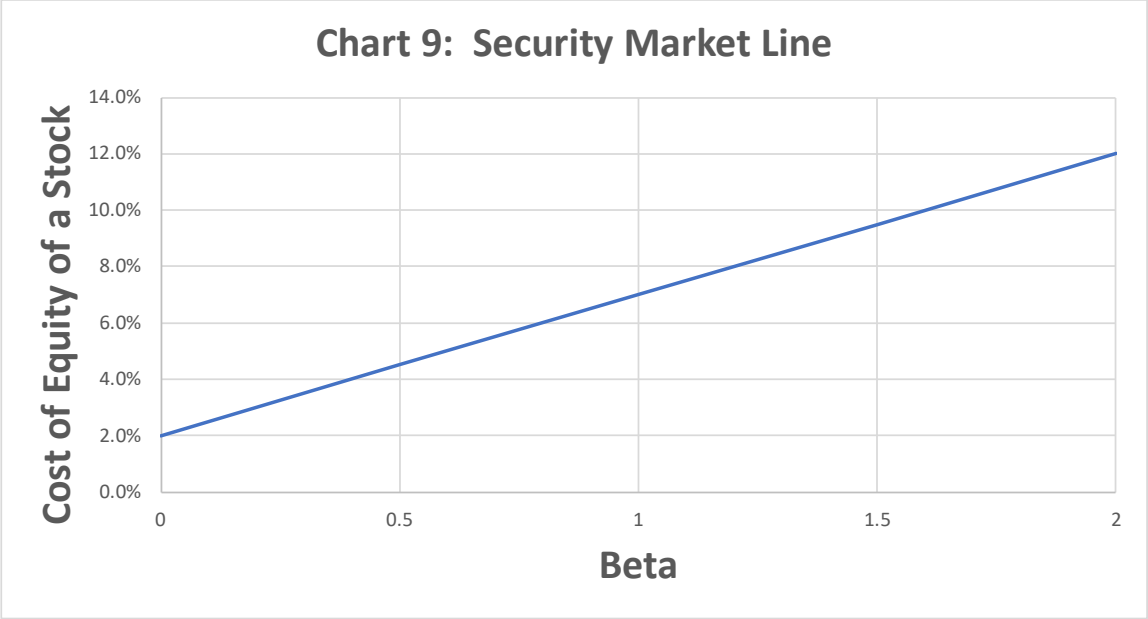
F. Capital Asset Pricing Model

Q. PLEASE DESCRIBE THE CAPM.

A. CAPM stands for "Capital Asset Pricing Model." The CAPM relates return to risk; specifically, it relates the expected return on an investment in a security to the risk of investing in that security. The riskier the investment, the greater the expected return (*i.e.*, the cost of equity) investors require to make for that investment.

Investors in a firm's equity face two types of risks: (1) firm-specific risk and (2) market risk (financial analysts refer to this market risk as systematic risk). Firm-specific risk refers to risks unique to the firm such as management performance and losing market share to a new competitor. Investors can reduce firm-specific risk by purchasing stocks as part of a diverse portfolio of companies if they construct the portfolio to cause the firm-specific risk of individual companies to balance out. Market-related risk refers to potential impacts from the overall market such as a recession or interest rate changes. This risk cannot be removed by diversification, so the investor must bear it no matter what. Because the investor has no option but to bear market risk, the investor's cost of equity will reflect that risk. The CAPM predicts that for a given equity security, the cost of equity has a positive linear relationship to how sensitive the stock's returns are to movements in the overall market (e.g., S&P 500). A security's market sensitivity is measured by its **Beta.**[32] As shown in Chart 9 on page 47, the higher the beta of a stock, the higher the company's cost of equity—the return required by the investor to invest in the stock.

[32] The covariation of the return on an individual security with the return on the market portfolio.



Here is the standard CAPM formula:

$$K = Rf + \beta i * (Rm - Rf)$$

Where:

K is the cost of equity;
Rf is the risk-free interest rate;
Rm is the expected return on the overall market (e.g., S&P 500);
[Rm – Rf] is the premium investors expect to earn above the risk-free rate for investing in the overall market ("equity risk premium" or "market risk premium"); and
βi (Beta) is a measure of non-diversifiable, or systematic, risk.

Q. PLEASE EXPLAIN HOW YOU IMPLEMENTED THE CAPM.

A. First, I determined appropriate values or ranges for each of the three model inputs: (a) Risk-Free Rate, (b) Beta, and (c) Equity Risk Premium. Second, I used the equation above to calculate the cost of equity implied by the model. Below I will explain how I calculated the three model inputs and summarize the CAPM cost of equity numbers resulting from those inputs. Table 8 on page 66 shows the results of my CAPM.

Risk Free Rate

Q. WHAT RISK-FREE RATE DID YOU USE IN YOUR CAPM?

A. It is generally preferable to use the market yield on short-term U.S. Treasury yields as the risk-free rate because these bonds have a beta close to zero. The *Principles of Corporate Finance* states "The CAPM… calls for a short-term interest rate."[33] I chose to use a risk-free rate based on both long- and short-term Treasury yields, however, because, as indicated by the steepness of the yield curve,[34] investors expect short-term interest rates to increase. My short-term risk-free rate is 0.10%,[35] based on short-term U.S. Treasury bills (3-months) as of September 30, 2020. My long-term risk-free rate is 1.46%, based on the yield of long-term U.S. Treasury bonds (30-years) as of September 30, 2020. U.S. government bonds are reasonable to use as a risk-free rate because they have a negligible risk of default. The value of short-term U.S. Treasury bills has a relatively low exposure to swings in the overall market. The value of long-term U.S. Treasury bonds is relatively more exposed to the market and therefore must be used with caution. I considered using a risk-free rate based on subtracting the historical spread between long-term and short-term U.S. Treasury bills from current long-term yields, as recommended by some financial textbooks.[36] I did not use this method because in the current capital markets, this method results in an unreasonably low risk-free rate (under 0%).

[33] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 228.
[34] The yield curve on U.S. Treasury bonds relates the yield to its time to maturity. We say the current yield curve is steep because the difference in yield between short-term (near 0%) and long-term (over 1%) bonds is large in percentage terms.
[35] Exhibit ALR-5, page 2.
[36] Brealey, Myers, and Allen (2017), Principles of Corporate Finance, 12th Edition, McGraw-Hill Irwin, New York, page 228.

Q. DO YOU USE BOTH MOST RECENT SPOT AND HISTORICAL AVERAGES IN DETERMINING YOUR RISK-FREE RATE?

A. No. Even though I do use both methodologies for stock prices, dividend yields, betas, market premia, and every other market-based input as stated previously, I do not use them for the risk-free rate. Historically, this has been because the yields on 3-month Treasury bills and 30-year Treasury bonds do not fluctuate as much as other market-data. Even though there was a very pronounced change in March 2020 as a result of the COVID-19 pandemic, there has been every indication that investors expect rates and yields to remain at current low levels for the foreseeable future,[37] which is why I opted not to alter my methodology. It is worth noting that any form of averaging or weighing approach applied to the last eight months of historical yield data would not have any significant effect on my CAPM results.

Q. WHAT IS YOUR RESPONSE TO ANALYSTS WHO CLAIM THAT THE CAPM MUST BE IMPLEMENTED WITH A LONG-TERM INTEREST RATE (E.G., YIELD ON 30-YEAR TREASURY BOND) AS AN ESTIMATE OF THE RISK-FREE RATE COMPONENT OF THE CAPM?

A. When looking for a security to calculate an estimate of the risk-free rate, it could be argued that it is appropriate to find one with a term or maturity that best matches the life of the asset being financed. In that sense, the 30-year Treasury bond yield can be argued to be ideal for this specific application. However, it is equally important to find a security that

[37] The yield on 30-year U.S. Treasury bonds has remained under 1.8% since March 5, 2020. If investors expected interest rates to increase the yield on these bonds would not remain low because the owner of these bonds would lose if they increased. Assuming investors do not want to lose money, investors do not expect interest rates to increase. Interest rate data from U.S. Department of The Treasury.

has a beta coefficient with the overall market as close to zero as possible, because by the very definition of the risk-free rate in the CAPM model, its movements should have no correlation to the movements of the market. And this is where the problem with the 30-year Treasury bond yield arises, as it has an established non-zero beta. The 3-month Treasury bill yield has a considerably lower beta, and therefore is superior in that respect to the 30-year Treasury bond yield. Neither one is a perfect fit on both fronts, which is why I have chosen to consider both as proxies for the risk-free rate to establish a range for my CAPM results.

Q. HOW DO YOU RESPOND TO ANALYSTS WHO CLAIM THAT THE RISK-FREE RATE SHOULD BE BASED ON INTEREST RATE FORECASTS FROM FIRMS SUCH AS BLUE CHIP FINANCIAL?

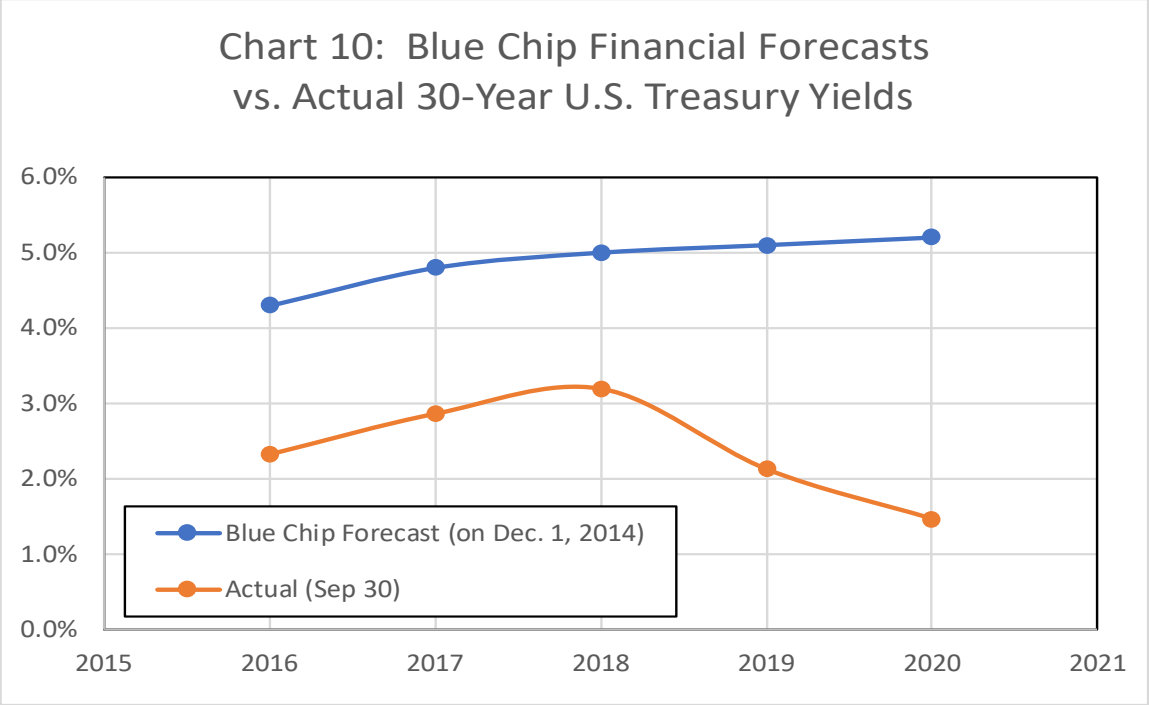
A. It is important to recognize that current long-term Treasury bond yields represent a direct observation of investor expectations and there is no need to use "expert" forecasts such as Blue Chip to determine the appropriate risk-free rate to use in a CAPM analysis or any other cost of equity calculations.

Many economists and forecasters will continue to be quoted in the press prognosticating on possible developments that are truly unpredictable. The Nobel Laureate Economist Daniel Kahneman stated the following regarding forecasting:

> It is wise to take admissions of uncertainty seriously, but declarations of high confidence mainly tell you that an individual has constructed a coherent story in his mind, not necessarily that the story is true.[38]

[38] Daniel Kahneman, *Thinking Fast and Slow* (New York: Farrar, Straus and Giroux, 2011): 212.

As Chart 10 below shows, Blue Chip Financial forecasted in 2014 that 30-Year U.S. Treasury bonds would be over 5% by 2018 while in fact they turned out to be under 2%.



The time covered in Chart 10 above was chosen to provide a concrete example. Blue Chip's interest rate forecasts have been persistently inaccurate for decades. A recent paper published by the Congressional Budget Office determined Blue Chip consensus forecasts exhibited "significant positive bias" between 1984 and 2012 and "have become more biased and less accurate over time."[39]

Beta

[39] Did Treasury Debt Markets Anticipate the Persistent Decline in Long-Term Interest Rates?, Congressional Budget Office, Edward N. Gamber, page 2. This paper can be found at: https://www.cbo.gov/system/files/115th-congress-2017-2018/workingpaper/53153-interestrateswp.pdf

Q. WHAT BETA DID YOU USE IN YOUR CAPM?

A. Since the cost of equity should be based on investor expectations, I chose to use two betas. My "forward beta" is based on forward-looking investor expectations of non-diversifiable risk. My "hybrid beta" is based on both forward-looking investor expectations and historical return data.

Most published betas are based exclusively on historical return data. For example, Value Line publishes a 5-year historical beta for each of the companies it covers. However, it is also possible to calculate betas based on investors' expectations of the probability distribution of future returns. This probability distribution of future returns expected by investors can be calculated based on the market prices of stock options.

Q. WHAT IS A STOCK OPTION?

A. A stock option is the right to buy or sell a stock at a specific price for a specified amount of time. A call option is the right to buy a stock at a specified exercise or strike price on or before a maturity date. A put option is the right to sell a stock at a specified exercise or strike price on or before a maturity date. For example, a call option to purchase Apple Computer stock for $230 on January 17, 2020 allows the owner the option (not the obligation) to buy Apple stock for $230 on that date. At the end of July 2019, Apple stock was trading at about $215 per share. Why would anyone pay for the right to buy a stock higher than the current price? Investors who purchased those call options thought there was a chance Apple stock would be trading higher than $230 on January 17, 2020, and those options gave those investors the right to buy Apple stock for $230 and profit by selling it at the market price on that date, if it was higher. The price of Apple's stock was $317.98 at the close of trading on January 17, 2020. Therefore, the investor who purchased

this call option for $635 on July 31, 2019 earned a profit of $8,163[40] at expiry on January 17, 2020. On the other hand, the investor who purchased an Apple put option with the same expiration date and strike price on July 31, 2019 would have lost the price of the option ($2,248) and gained nothing on the expiration date because the right to sell Apple stock for $230 when the price is over $300 is worthless.

The market prices of put options and call options provide information regarding the probability distribution of future stock prices expected by investors. Using established techniques, I am able to use price data for stock options of my Electric Proxy Group companies and the S&P 500 Index to determine investors' return expectations, including the relationship (covariance) between the return expectations for individual Electric Proxy Group companies and those for the overall market (S&P 500). This covariance between the expected returns for my Electric Proxy Group and for the S&P 500 indicates what investors expect betas will be in the future. I refer to betas based on option price calculations as "option-implied betas."

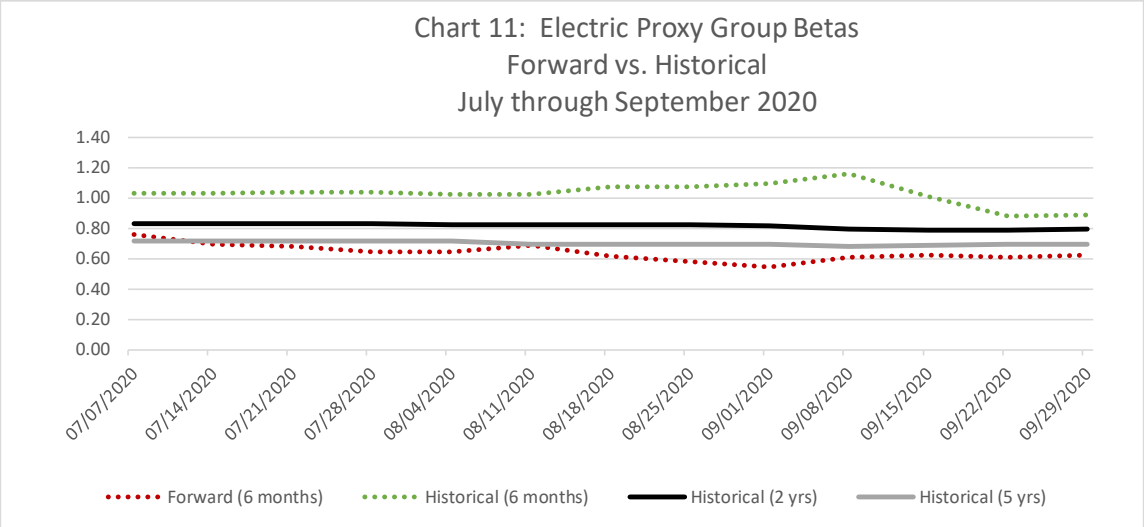
Q. PLEASE EXPLAIN HOW YOU CALCULATED THE BETAS USED IN YOUR CAPM.

A. Traditionally, the betas used in CAPM calculations are calculated from historical returns. This approach has strengths and weaknesses. An alternative way to calculate betas is to incorporate investors' return expectations by calculating option-implied betas as explained in the previous paragraph. As discussed below, I have chosen to use both historical and option-implied betas in my CAPM analysis. I chose to use option-implied betas in my

[40] $8,163 profit from exercising call option ($31,798 from selling at $317.98 market price - $23,000 cost to purchase at $230) - $635 ($6.35 X 100) option purchase price. Note: Each call option is the right to purchase 100 shares.

CAPM analysis because, among other reasons, studies have found that betas calculated based on investor expectations (option-implied) provide information regarding future perceived risks and expectations.[41]

As shown in Chart 11 below, stock option prices indicate that investors likely expect lower betas for the Electric Proxy Group in the future.



See Exhibit ALR-5, page 3 for data used in creating Chart 11 above.

I used the following two betas in my CAPM analysis:

1. **Hybrid Beta:** 50% Option-Implied Beta (6 months) + 25% Historical Beta (6 months) + 15% Historical Beta (2 years) + 10% Historical Beta (5 years).
2. **Forward Beta:** 100% Option-Implied Beta (6 months).

Q. PLEASE EXPLAIN HOW YOU CALCULATED HISTORICAL BETAS.

A. I calculate historical betas following the methodology used by Value Line. Specifically, I use the following guidelines:

[41] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg. (2011) Option-Implied Measures of Equity Risk, *Review of Finance* 16: 385-428.

1. Returns for each security are regressed against returns for the overall market in the following form:

$$Ln\left(p^{I}_{t} / p^{I}_{t-1}\right) = a_{I} + B_{I} * Ln\left(p^{m}_{t} / p^{m}_{t-1}\right)$$

Where:

- p^{I}_{t} is the price of the security I at time t
- p^{I}_{t-1} is the price of the security I one week before time t
- p^{m}_{t} and p^{m}_{t-1} are the corresponding values of the market index
- B_I is the regression estimate of Beta for the security against the market index

2. The natural log of the price ratio is used as an approximation of each return and no adjustment is made for dividends paid during the week.
3. Weekly returns are calculated weekly on Tuesdays to minimize the effect of holidays as much as possible.
4. Betas calculated using the regression method above are adjusted as per Blume (1971) using the following formula:

$$\text{Adjusted } B_{I} = 0.35 + 0.67 * \text{Calculated } B_{I}$$

The only significant difference between my beta calculations and Value Line's calculations is that, whereas Value Line uses the NYSE Composite Index as the market index, I use the S&P 500 Index. S&P 500 Index has a much larger number of options traded, making the calculation of option-implied betas more reliable, and I wanted to make my historical betas as comparable as possible to my option-implied betas. Value Line only calculates betas every three months and always uses a five year period for the return

regression in their company reports,[42] whereas I use the same consistent methodology to calculate betas every week during the most recent three complete months (May, June, and July 2020) and calculate historical betas for periods of six months, two years, and five years, as shown in Chart 11 on page 54.

Q. PLEASE EXPLAIN HOW YOU CALCULATED OPTION-IMPLIED BETAS.

A. Calculating option-implied betas of a company requires (1) obtaining stock option data for that company and a market index, (2) filtering the stock option data, (3) calculating the option-implied volatility for the company and for the index, (4) calculating the option-implied skewness for the company and for the index, and (5) calculating option-implied betas for the company based on implied volatility and skewness for the company and for the index. There are various ways one could choose to perform the steps above, but I chose to filter stock option data and calculate option-implied volatility[43] and skewness[44] following exactly the same methodology used by the Chicago Board of Options Exchange (CBOE) in the calculation of their widely-used VIX (or Volatility Index) and SKEW Index, respectively.

I start my process with publicly available trading information for all the options for a given security (company or index) for a complete trading day. I then filter the option data as described by the CBOE using the following guidelines:

1. Use the mid-quote or mark (average of bid and ask) as the option price.
2. Use only out-of-the-money call and put options.

[42] They offer betas calculated over different time periods on their website, including 3 years and 10 years.
[43] CBOE Volatility Index White Paper, 2018. Cover page says "proprietary information." The author has had access to this document in the public domain for at least 3 years.
[44] The CBOE SKEW Index, 2010. Cover page says "proprietary information." The author has had access to this document in the public domain for at least 3 years.

- Determine the "moneyness" threshold where absolute difference between call and put prices is smallest (using CBOE "Forward Index Price" formula).
- Include "at-the-money" call and put options and use average of call and put prices as price for "blended" option.

3. Exclude all zero bids.
4. Exclude remaining (more out-of-the-money) options when two sequential zero bids are found.

I then apply the series of formulas clearly described in both of the CBOE's white papers to the remaining options to calculate Option-Implied Volatility and Option-Implied Skewness. In the words of the CBOE, each of its two indices is "an amalgam of the information reflected in the prices of all of the selected options." To be clear, Implied Volatility is not exactly the same as the VIX Index and Implied Skewness is not exactly the same as the SKEW Index, but both indices are directly based on their corresponding statistical value.

Option-Implied Volatility reflects investors' expectations regarding future stock price movements. Option-Implied Skewness reflects investors' expectations regarding how implied volatility changes for strike prices that are closer and further to the current value of the underlying stock price.

The CBOE calculates Times to Expiration by the minute—as do I. The Time to Expiration of traded options cannot be changed and varies from day to day. For the sake of consistency, the CBOE calculates the VIX and SKEW indices on a "30-day" basis by interpolating for two sets of options with Times to Expiration closest to the 30-day mark.

I prefer to focus on as long of a time horizon as possible for forecasting purposes. Option Times to Expiration vary significantly for various stocks but can relatively consistently be found to go out to 6 months (180 days) for utility companies. Therefore, for the sake of consistency, I have chosen to interpolate to calculate 6-month volatility and skewness where possible. Occasionally, Times to Expiration for a given stock do not go out to 180 days. If the greatest Time to Expiration available is 171 days (95%) or greater, I use the volatility and skewness for that group of options as a proxy for the 180-day volatility and skewness, respectively.

Finally, once I have calculated the option-implied volatility and skewness for each company and index using the methodology described above, I calculate option-implied betas using the following formula developed by Christoffersen and Chang (2011): [45]

$$\beta_i = \left(\frac{SKEW_i}{SKEW_m}\right)^{1/3} \quad \left(\frac{VAR_i}{VAR_m}\right)^{1/2}$$

Where:

β_i: $option - implied\ beta\ of\ security\ (e.g. stock, fund)$;
$SKEW_i$: $skewness\ of\ security$;
$SKEW_m$: $skewness\ of\ overall\ market\ (S\&P\ 500)$;
VAR_i: $variance\ of\ company$;
VAR_m: $variance\ of\ overall\ market\ (S\&P\ 500)$.

[45] Bo-Young Chang & Peter Christoffersen & Kris Jacobs & Gregory Vainberg. (2011) Option-Implied Measures of Equity Risk, *Review of Finance* 16: 385-428.

Q. YOU CALCULATE YOUR OPTION-IMPLIED BETAS BASED ON A SIX-MONTH HORIZON. WOULD IT NOT BE BETTER TO USE A LONGER FORECASTING HORIZON?

A. The methodology I use to calculate my option-implied betas "allows for the computation of a complete term structure of beta for each company so long as the options data are available,"[46] so there is nothing inherent in the methodology that limits it to a certain time horizon.

For many applications, including cost of capital, one could argue that the longer the time horizon for the option-implied betas, the better. However, the limitation on the forecasting horizon is always set by the longest expiration period of the options currently traded in the market. Some companies trade options with expiration periods up to two years or more into the future. As evidenced by the exhaustive option data in my working papers, the maximum expiration period for the options of the companies in my Electric Proxy Group is between six and twenty-seven months. Only 12 of the 36 companies trade options with expiration periods of eight months or more, so for consistency across companies in my proxy group, I chose to use six months for the time horizon of my option-implied betas.

Simply because it may be better to use longer time horizons in place or in addition to a six-month horizon, it does not mean that a six-month option-implied beta is of no relevance or cannot be used. That would be paramount to saying you cannot use a one-year Value Line Earnings Per Share estimate, or that the minimum relevant forecast is two or three years. In fact, for purposes of option-implied betas, it would be difficult to say if

[46] Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, "Forward-Looking Betas", April 25, 2008, Page 24.

a time horizon of one year, for instance, is necessarily always better than a time horizon of six months. An option-implied forward-looking beta, even with a time horizon of less than six months, is still a useful tool in interpreting the current expectations of investors at any given time.

A final strong argument in support of using six-month option-implied betas in a cost of capital calculation looking years into the future is that, as expanded upon on pages 61 and 62, the authors of the paper on which I based my option-implied betas concluded that their predictive powers are not limited to six months into the future. In fact, they conclude that six-month option-implied betas have stronger predictive power than six-month, one-year, or five-year historical betas when attempting to forecast betas one or two years into the future.

Q. WHY DIDN'T YOU USE LONG-TERM EQUITY ANTICIPATION SECURITIES (LEAPS), WHICH ARE OPTIONS CONTRACTS WITH AN EXPIRATION DATE OF TYPICALLY MORE THAN ONE YEAR?

A. It is not possible to use LEAPS to calculate option-implied betas for all utility companies because these contracts are not traded for many of them. Only 12 of the 36 companies in my Electric Proxy Group trade options with expiration periods of eight months or more. For consistency across companies in my proxy group, I chose to use six months for the time horizon of my option-implied betas. As explained above, option-implied betas calculated from options contracts with expiration periods less than one year, in my case six months, are still a useful tool in interpreting investors' current expectations and are superior to the historical betas used exclusively by Dr. Vander Weide. As a further note, I use LEAPS in my CAPM when the data is available. The risk premium portion of my CAPM

is based on options contracts with expiration periods exceeding one year, and as far out as 32 Months.

Q. HOW DID YOU DECIDE ON THE RELATIVE WEIGHTS YOU ALLOCATE TO EACH COMPONENT OF YOUR HYBRID BETAS? IS THERE ANY ACADEMIC SUPPORT FOR YOUR APPROACH?

A. I am not aware of any academic study specifically focused on the optimal relative weight of historical betas to predict future betas. However, the authors of the paper I relied upon for guidance on the calculation of my option-implied betas did attempt to quantify the predictive power of six-month option-implied ("forward-looking") betas as well as that of six-month ("180-day"), one-year, and five-year historical betas by back-testing historical predictions with actual *expost* results, or "realized" betas, for the 30 companies in the Dow Jones Index. In addition to using each of the betas above independently, they also measured the predictive power of a "mixed" beta consisting of a simple average of the six-month option-implied beta and the six-month historical beta.

Their conclusions for predicting six-month future betas are as follows:

> The forward-looking beta outperforms the other methods ten times, and the same is true for the 180-day historical beta. The mixed beta is the best performer in seven cases, and the 1-year historical beta in three cases. The 5-year historical beta is always outperformed by at least one other method, and it often ranks last. The 180-day historical beta clearly dominates the two other historical methods.[47]

Their conclusions for predicting one-year and two-year future betas are as follows:

> Somewhat unexpectedly, the performance of the forward-looking beta compared to that of the 180-day historical beta is much better [for the one-year prediction] than [for the six-month prediction], and this conclusion carries over to [the two-year prediction]. The mixed beta also perform well. It is perhaps not surprising that the performance of the 180-day historical

[47] Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, "Forward-Looking Betas", April 25, 2008, Page 16.

> beta [for the one- and two-year predictions] is poorer than [for the six-month prediction], because the horizons used in the construction of realized betas are no longer equal to 180 days. What is harder to explain is why the correlation between realized beta and forward-looking beta is in many cases higher [for the one- and two-year predictions] than [for the six-month prediction]. Finally, it is also interesting that the 1-year and 5-year historical betas do not perform well [for the one-and two-year predictions]. In summary, [for the one-year prediction] either the forward-looking beta or the mixed beta is the best performer in nineteen out of thirty cases. [For the two-year prediction], this the case twenty-two times out of thirty.[48]

Their conclusions strongly support the use of six-month historical betas, six-month option-implied betas, and/or an average of the two as predictors of future betas six months, one year, or two years into the future. They also seem to indicate that historical betas lose predictive power the longer the period that is used.

I decided on the composition of my hybrid betas primarily based on the conclusions of the authors above. A mixed or hybrid beta made up of 50% historical betas and 50% forward-looking option-implied betas seemed to be the best way to go. Though the predictive power of longer-term historical betas seems to be quite reduced, it is not zero, so in an effort to preserve the effect of longer-term market trends in my hybrid betas, I chose to further subdivide the historical component into 50% (25% of the hybrid) for the stronger predicting six-month historical betas, 30% (15% of the hybrid) for the two-year historical betas, and 20% (10% of the hybrid) for the five-year historical betas.

Market Risk Premium

Q. PLEASE EXPLAIN HOW YOU CALCULATED THE EQUITY RISK PREMIUM USED IN YOUR CAPM.

A. Traditionally, the risk premium used in CAPM calculations is calculated from historical returns and/or equity analyst projections. The former approach is historically accurate but

[48] Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, "Forward-Looking Betas", April 25, 2008, Page 17.

does not take into account investors' expectations for future market risks and returns. The latter approach is based on analyst projections, which are not market-based and do not reflect current investor expectations. A superior market-based way to calculate the equity risk premium is to use option-implied return expectations, which is the approach I have used.

My equity risk premium is the expected return on the S&P 500 minus the risk-free rate. I calculate an expected return on the S&P 500 by using stock options traded on this index. To begin with, I use exactly the same methodology used by the CBOE to filter stock option data and calculate option-implied volatility and skewness,[49] as described in detail in the Beta section on page 56. The volatility and skewness calculated in this way describe a probability function representing the market consensus of possible trajectories for the S&P 500. The skewed probability function can be closely approximated by a log-normal function using established statistical formulas, which then make it straightforward to calculate the expected growth for the S&P 500 for any given cumulative probability, or market confidence level.

Once the option-implied growth rate of the S&P 500 has been estimated as described above, I add the dividend yield and subtract the risk-free rate in order to arrive at the market risk premium, as laid out in Exhibit ALR-5, page 4. As described in the Risk-Free Rate section above, I use the September 30, 2020 yields of 3-month U.S. Treasury bills and 30-year U.S. Treasury bonds as my risk-free rates throughout my CAPM analysis.

[49] As used in the calculation of their widely-used VIX (or Volatility Index) and SKEW Index, respectively.

Q. DID YOU TAKE INTO CONSIDERATION THE DIFFERENCE IN VOLATILITIES ACROSS EXPIRATION PERIODS IN THE OPTIONS TRADED ON THE S&P 500?

Yes. The volatility implied by the options market changes over time as investors' perception of risk changes. For example, during a crisis, implied volatility generally increases as investors expect that stock market prices have a greater chance of large swings compared to times when there is no crisis. As discussed earlier, investors also often have different volatility expectations over different time periods. For example, on any given day, investors might expect volatility to be relatively high over the next 30 days and decrease over the next year or longer. The same holds true for skewness, even though it is less intuitive to understand changes in skewness than in volatility. Because of these changes across option expiration periods, I take a weighted average of the entire term structure of the option-implied volatility and skewness, which for the S&P 500 typically goes out to 26 to 35 months, interpolating where necessary, and giving the most weight to the option expiration period of 12 months.

Q. WHICH CUMULATIVE PROBABILITY DID YOU USE TO ESTIMATE THE OPTION-IMPLIED GROWTH OF THE S&P 500 IN THE CALCULATION OF YOUR MARKET RISK PREMIUM? AND PLEASE ELABORATE ON WHAT THIS "MARKET CONFIDENCE LEVEL" REPRESENTS.

I used a cumulative probability with a market confidence level of 80% in the calculation of my option-implied growth for the S&P 500, which I calculated as 11.17%. This means that the aggregate market consensus is that there is an 80% probability that the

S&P 500 will grow at an annual rate of 11.17% or less. Put another way, investors overall believe that there is only a 20% chance that the S&P 500 will grow at a higher rate.

There is no confidence level that yields a "correct" answer for the expected growth rate since everything comes down to probabilities implied by option prices. But it is important to note that values on the tails of the probability function get increasingly separated, requiring an ever-increasing growth rate for every additional percentage in the confidence level, and making it impossible to ever arrive at 100%.

Using the reverse of the methodology described above, one can also calculate the confidence level implied by a given cost of capital. For instance, using the same risk-free rates and betas in my CAPM analysis, the rate of return on equity of 10.4% recommended by Dr. Vander Weide implies an average market risk premium of 14.1%, an average overall market return of 14.8%, average growth for the S&P 500 of 13.1%, and a confidence level of 85.6%. In other words, the growth of 13.1% would exceed 85.6% of the scenarios investors see as plausible for the market in aggregate.

CAPM Results

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR CAPM.

A. Table 8 on page 66 shows the results of my CAPM analysis.

TABLE 8: CAPITAL ASSET PRICING MODEL (CAPM) - INDICATED COST OF EQUITY
(80% of Market Confidence Level)

	3-Month Treasury Bill		30-Year Treasury Bond	
	Hybrid Beta	Forward Beta	Hybrid Beta	Forward Beta
Risk Free Rate	0.10%	0.10%	1.46%	1.46%
Beta	0.76	0.62	0.76	0.62
Risk Premium	12.82%	12.82%	11.46%	11.46%
CAPM	9.79%	8.10%	10.12%	8.61%

Source: Exhibit ALR-5, page 1

VI. ADDITIONAL COMMENTS ON DR. VANDER WEIDE'S TESTIMONY

Q. PLEASE SUMMARIZE THE TESTIMONY OF DR. VANDER WEIDE.

A. Dr. Vander Weide has recommended that the Company be allowed a return on equity of 10.4% and claims DESC's requested capital structure containing 53.35% equity and 46.65% long-term debt is a "reasonable capital structure for rate making purposes."[50] He arrived at his recommendation by applying the following six cost of equity models that he claims are "generally accepted methods for estimating the cost of equity": (1) Discounted Cash Flow ("DCF"), (2) Ex Ante Risk Premium, (3) Ex Post Risk Premium, (4) CAPM – Historical, (5) CAPM – Forward Looking and (6) Comparable earnings. He applies his DCF, CAPM and Comparable Earnings methods to the 36 companies in his proxy group, his Ex Ante Risk Premium method to 24 electric utilities comprising the Moody's electric utility group and his Ex Post Risk Premium Method to an S&P 500 stock portfolio and S&P 500 utilities. Dr. Vander Weide states that his proxy group of 36 electric utilities is

[50] Dr. Vander Weide's Direct Testimony, page 46, lines 23.

"similar in risk to DESC."[51] As outlined in Table 9 below, these approaches provide equity cost rate estimates between 9.0% and 10.70% (averaging 9.8%).

TABLE 9: DR. VANDER WEIDE'S COST OF EQUITY RESULTS

METHOD	Cost of Equity Model Results
Discounted Cash Flow	9.3%
Ex Ante Risk Premium	10.1%
Ex Post Risk Premium	9.0%
CAPM - Historical	9.4%
CAPM - Forward Looking	10.7%
Comparable Earnings	10.1%
Average Cost of Equity Model Result	9.8%

Dr. Vander Weide claims that DESC's cost of equity is higher than the average of his cost of equity model results (9.8%) because the Company's book value rate making capital structure has greater financial risk than the market cost of equity estimates for the companies in his proxy group.[52] He concludes that in order for DESC to have an opportunity to earn a 9.8% market return it must be allowed a 10.4% return on book equity.[53]

Q. IS DESC REQUESTING A 10.4% COST OF EQUITY AS RECOMMEND BY DR. VANDER WEIDE?

A. No. DESC is requesting a 10.25% cost of equity and an 8.48% rate of return.[54] According to Ms. Griffin's Direct Testimony, the Company believes that a 10.25% cost of equity "can be sufficient within the context of an order that is otherwise viewed by the rating agencies

[51] Ibid. page 47, lines 6-7.
[52] Ibid. pages 46, lines 24-26.
[53] Ibid. page 47, lines 13-15.
[54] Griffin's Direct Testimony, page 10, Chart A.

and investment community as reasonable and supportive of the financial health of the Company."[55]

Q. HOW DOES DR. VANDER WEIDE DEFINE THE COST OF EQUITY?

A. Dr. Vander Weide defines the cost of equity as market-based and forward looking. He states the following: (1) "Economists define the cost of equity as the return investors expect to receive on alternative equity investments of comparable risk." (2) "There is also agreement among economists that the cost of equity is both forward looking and market based".[56] (3) regarding expected return he states "From the investor's point of view, the historical cost, or book value of their investment, is generally a poor indicator of the portfolio's current value."[57]

Q. IS DR. VANDER WEIDE'S STATED DEFINITION OF THE COST OF EQUITY CONSISTENT WITH HOW HE DERIVED HIS 10.4% RECOMMENDATION?

A. No. First, his Comparable Earning Method his based on analyst forecasted accounting returns (return on book equity), not on expected market returns. Second, in both his CAPM and Risk Premium Methods he uses forecasted interest rates (EIA, Value Line) instead of actual market yields. Third, both his Ex Ante Risk Premium and Ex Post Risk Premium methods are based on an analysis of historical returns and therefore backward looking.

[55] Griffin's Direct Testimony, page 17, lines 8-11.
[56] Dr. Vander Weide Direct Testimony, page 8, lines 13-19.
[57] Ibid. page 9, 19-20.

Q. WHAT IS YOUR OVERALL RESPONSE TO DR. VANDER WEIDE'S TESTIMONY?

A. Dr. Vander Weide's 10.4% recommendation significantly overstates DESC's market-based cost of equity. I agree with DESC witness Griffin that a cost of equity lower than Dr. Vander Weide's 10.4% cost of equity recommendation would be sufficient for the Company to raise equity capital. However, I believe the Company's 10.25% cost of equity request is still excessive because it is above investors return requirements as indicated by the results of my market-based cost of equity models discussed above. If the Company's 10.25% requested return on equity is used to set rates, consumers will be overcharged by approximately $77 million per year.

Dr. Vander Weide's 10.4% cost of equity recommendation is excessive because: (1) the growth rate component of his DCF has been derived incorrectly; (2) his risk premium calculations[58] are based on arithmetic mean returns instead of appropriate geometric mean returns; (3) he uses interest rate forecasts instead of investors' yield expectations as indicated by market data; and (4) his financial risk adjustment to account for the difference between the market-based capital structure of his proxy group and the ratemaking capital structure of DESC is inappropriate.

A. <u>Financial Risk Adjustment</u>

Q. IS IT APPROPRIATE TO INCREASE DESC'S COST OF EQUITY FROM 9.8% TO 10.4% BECAUSE ITS RATE MAKING CAPITAL STRUCTURE IS

[58] Risk premium portion of his CAPM Historical and his Ex Post Risk Premium methods.

DIFFERENT THAN THE AVERAGE MARKET VALUE CAPITAL STRUCTURE OF THE COMPANIES IN HIS PROXY GROUP?

A. No. Market value capital structure and book value capital structure are two completely different ways of measuring the same thing. Concluding that a market value capital structure is lower in risk because it contains more equity than the book value based capital structure for the same company is as inconsistent and illogical as claiming that a person who weighs 150 pounds could lose weight simply by stepping on a scale that measures weight in kilos instead of pounds.

Financial risk is determined by a company's ability to meet its cash flow obligations. The most common and perhaps most important single measure of financial risk is the pretax interest coverage ratio. The interest coverage ratio is computed by dividing the sum of interest expense and pre-tax income by interest expense. This number is useful because it gives bondholders a sense of how far earnings would have to decline before a company would not be able to meet its interest payments. For example, if a company has an interest coverage ratio of 3.0, this means that at its current earnings rate, its earnings available for both payment of interest and pre-tax earnings is three times as much as is needed to make its interest payments.

B. DCF Method

Q. WHAT FORMULA DOES DR. VANDER WEIDE USE IN HIS DCF ANALYSIS?

A. $K = \frac{D_1}{P_s} + g$ [59]

Where:

[59] Dr. Vander Weide's Direct Testimony, page 25, lines 10-15.

P_s: current *stock price*;
D_1: expected next period annual *dividend*;
g: *growth rate*.

Q. DOES DR. VANDER WEIDE PROPERLY APPLY THE SIMPLIFIED OR CONSTANT GROWTH DCF METHOD?

A. No. To calculate the growth component of the quarterly DCF model, he uses three-to five-year analyst earnings per share growth forecasts.[60] This is not appropriate because, among other reasons, these forecasts are only point estimates between two specific time periods. This will over or understate the cost of equity if investors do not expect this time period to be sustainable in perpetuity. This discussed below, a future-oriented "b x r" method is superior way to calculate the growth rate component of a DCF model than the one used by Dr. Vander Weide.

Q. WHY DOES DR. VANDER WEIDE MECHANCIALLY USE ANALYST FORECASTS IN HIS DCF ANALSYIS?

A. He states that uses these estimates because they "(1) are widely circulated in the financial community, (2) include the projections of reputable financial analysts who develop estimates of future EPS growth, (3) are reported on a timely basis to investors, and (4) are widely used by institutional and other investors."[61]

[60] Ibid. page 26, lines 24-27 and page 27, lines 1-6.
[61] Ibid. page 27, lines 12-26.

Q. IF ANALYSTS' FORECASTS ARE WIDELY USED BY INVESTORS AS DR. VANDER WEIDE CLAIMS DOES THAT MEAN THAT USING THESE FORECASTS IN A DCF ANALYSIS IS JUSTIFIED?

A. No. Even if these forecasts are widely used by investor relying entirely on analysts' 5-year EPS growth forecasts to calculate the growth component of DCF is inappropriate. The correct application of the DCF method requires that the dividend yield be computed properly, and that the growth rate used be derived from a careful study of what future *sustainable* growth in cash flow is anticipated by investors. The way he uses analysts' forecasts in his DCF analysis is analogous to failing to reconcile the money you are taking out of your checking account with your future balance, i.e., the basic balancing of a checkbook.

Q. DO MAJOR FINANICAL INSTITUTIONS IMPLEMENT THE DCF METHOD AS DR. VANDER WEIDE HAS DONE?

A. Not that I am aware. As discussed in Section II on page 2 of this testimony, major financial institutions like J.P. Morgan Chase do not use a growth rate based on analysts' 5-year EPS growth rates as Dr. Vander Weide has done. J.P. Morgan Chase implements a sustainable growth DCF method as I do. J.P. Morgan states that its framework "analogous to Robert Higgins' sustainable growth rate (SGR) concept- ensures that higher shareholder payouts, for instance, would come at the expense of slower earnings growth, all else the same."[62]

[62] J.P. Morgan Asset Management – Long-Term Capital Market Assumptions, 2019 Annual Edition, pages 62-63.

Q. PLEASE SUMMARIZE WHY A FUTURE-ORIENTED "B X R" METHOD IS SUPERIOR TO A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE FORECAST IN PROVIDING A LONG-TERM SUSTAINABLE GROWTH RATE

A. The primary driver of sustainable earnings growth is earnings retention. A company is able to create higher future earnings by retaining a portion of the prior year's earnings in the business and purchasing new business assets with those retained earnings. There are many factors that can cause short-term swings in earnings growth rates, but the long-term sustainable growth is caused by retaining earnings and reinvesting those earnings. Factors that cause short-term swings include anything that causes a company to earn a return on book equity at a rate different from the long-term sustainable rate.

Assume, for example, that a particular utility company is regulated so that it is provided with a reasonable opportunity to earn 9% on its equity. Should the company experience an event such as the loss of several key customers, or unfavorable weather conditions, which cause it to earn only 6% on equity in a given year, the drop from a 9% earned return on equity to a 6% earned return on equity would be concurrent with a very large drop in earnings per share. In fact, if a company did not issue any new shares of stock during the year, a drop from a 9% earned return on book equity to a 6% earned return on book equity would result in a 33.3% decline in earnings per share over the period.[63] However, such a drop in earnings would not be an indication of the long-term sustainable earnings per share growth rate. If the drop were caused by weather conditions, the drop in earnings would be immediately offset once normal weather conditions return. If the drop

[63] By definition, earned return on equity is earnings divided by book value. Therefore, whatever level of earnings is required to produce earnings of 6% of book would have to be 33.3% lower than the level of earnings required to produce a return on book equity of 9%.

were from the loss of some key customers, the company would replace the lost earnings by filing for a rate increase to bring revenues up to the level required for the company to be given a reasonable opportunity to recover its cost of equity.

For the reasons above, changes in earnings per share growth rates that are caused by non-recurring changes in the earned return on book equity are inconsistent with long-term sustainable growth, but changes in earnings per share because of the reinvestment of additional assets is a cause of sustainable earnings growth. The "b x r" term in the DCF equation computes sustainable growth because it measures only the growth which a company can expect to achieve when its earned return on book equity "r" remains in equilibrium. If analysts have sufficient data to be able to forecast varying values of "r" in future years, then a complex, or multi-stage DCF method must be used to accurately quantify the effect.

Averaging growth rates over sub-periods, such as averaging growth over the first five years with a growth rate expected over the subsequent period, will not provide an appropriate representation of the cash flows expected by investors in the future, and therefore, will not provide an acceptable method of quantifying the cost of equity using the DCF method. The choices are either a constant growth DCF, in which one growth rate derived using "b x r" should be used, or a complex DCF method in which the cash flow anticipated in each future year is separately estimated. Dr. Vander Weide has done neither. Instead, he mechanically adds analysts' five-year earnings per share growth rate to the dividend yield which overstates the cost of equity.

Q. WHY ARE ANALYSTS' FIVE-YEAR CONSENSUS GROWTH RATES NOT INDICATIVE OF LONG-TERM SUSTAINABLE GROWTH RATES?

A. Analysts' five-year earnings per share growth rates are earnings per share growth rates that measure earnings growth from the most currently completed fiscal year to projected earnings five years into the future. These growth rates are not indicative of future sustainable growth rates in part because the sources of cash flow to an investor are dividends and stock price appreciation. While both stock price and dividends are impacted in the long-run by the level of earnings a company is capable of achieving, earnings growth over a period as short as five years is rarely in synchronization with the cash flow growth from increases in dividends and stock prices. For example, if investors perceive a company's earnings have temporary dipped below normal, stock prices would not decline to the same degree. Similarly, dividends are usually not cut just because of a temporary decline in a company's earnings. Unless both the stock price and dividends mirror every down swing in earnings, they cannot be expected to recover at the same growth rate that earnings recover. Therefore, growth rates such as five-year projected growth in earnings per share are not indicative of long-term sustainable growth rates in cash flow. As a result, they are not applicable for direct use in the simplified DCF method.

Q. IS THE USE OF FIVE-YEAR EARNINGS PER SHARE GROWTH RATES IN THE DCF MODEL ALSO IMPROPER?

A. Yes. A raw, unadjusted, five-year earnings per share growth rate is usually a poor proxy for either short-term or long-term cash flow growth that an investor expects to receive. When implementing the DCF method, the time value of money is considered by equating the current stock price of a company to the present value of the future cash flows that an

investor expects to receive over the entire time that he or she owns the stock. The discount rate required to make the future cash flow stream equal to the current stock price, on a net present value basis, is the cost of equity. The only two sources of cash flow to an investor are dividends and the net proceeds from the sale of stock at whatever time in the future the investor finally sells. Therefore, the DCF method is discounting future cash flows that investors expect to receive from dividends and from the eventual sale of the stock. Five-year earnings growth rate forecasts are especially poor indicators of cash flow growth.

Q. WHY IS A FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATOR OF THE FIVE-YEAR CASH DIVIDEND GROWTH EXPECTATIONS?

A. The board of directors of a company changes dividend rates based upon long-term earnings expectations combined with the capital needs of a company. Most companies do not decrease dividends simply because a company has a year in which earnings were below sustainable trends. Similarly, they do not increase dividends simply because earnings for one year happened to be above long-term sustainable trends. Therefore, over any given five-year period, earnings growth is frequently very different from dividend growth. In order for earnings growth to equal dividend growth, at a minimum, earnings per share in the first year of the five-year earnings growth rate period would have to be exactly on the long-term earnings trend line expected by investors. Since earnings in most years are above or below the trend line, the earnings per share growth rate over most five-year periods is different from what is expected for dividend growth.

Q. WHY IS THE FIVE-YEAR EARNINGS PER SHARE GROWTH RATE A POOR INDICATION OF FUTURE STOCK PRICE GROWTH?

A. If a company happens to experience a year in which earnings decline below what investors believe is consistent with the long-term trend, then the stock price does not drop anywhere near as much as earnings drop. Similarly, if a company happens to experience a year in which earnings are higher than the investor-perceived long-term sustainable trend, the stock price will not increase as much as the earnings. In other words, the P/E ratio of a company will increase after a year in which investors believe earnings are below sustainable levels, and the P/E ratio will decline in a year in which investors believe earnings are higher than expected. Since stock price is one of the important cash flow sources to an investor, a five-year earnings growth rate is a poor indicator of cash flow, both because it is a poor indicator of stock price growth over the five years being examined, and because it is equally a poor predictor of dividend growth over the period.

Q. ON PAGE 27 OF HIS DIRECT TESTIMONY, DR. VANDER WEIDE STATES THAT HE RELIED ON ANALYSTS' PROJECTIONS OF FUTURE EPS GROWTH BECAUSE THERE IS CONSIDERABLE EMPERICAL EVIDENCE THAT INVESTORS USE ANALYSTS' FORECASTS TO ESTIMATE FUTURE EARINGS GROWTH. PLEASE RESPOND.

A. The empirical evidence cited in his Direct Testimony are from studies conducted in 1982 (data from the 1960s), 1988 and 2004. A more recent study by McKinsey & Company in 2010 found that:

> …analysts have been persistently over optimistic for the past 25 years with estimates ranging from 10 to 12 percent a year, compared with actual earnings growth of 6 percent. Over this time frame, actual earnings growth surpassed forecasts in only two instances, both during the earnings

> recovery following a recession. On average, analysts' forecasts have been almost 100 percent too high.
>
> Capital markets, on the other hand, are notably less giddy in their predictions. Except during the market bubble of 1999-2001, actual price-to-earnings ratios have been 25 percent lower than implied P/E ratios based on analysts' forecasts. [64]

Even if equity analysts' forecasts were not upwardly biased, adding earnings per share growth forecasts to a dividend yield without considering the retention rate produces a flawed result. Using an earnings per share growth forecast as the growth component in a DCF model is like measuring how much money you will have in your bank account by simply adding up your paychecks. If you do not consider what percentage of your paycheck you will retain in your account and what percentage you will spend, your calculations will not be accurate.

Q. ARE YOU SUGGESTING THAT ANALYSTS' CONSENSUS EARNINGS PER SHARE GROWTH RATES ARE USELESS AS A TOOL TO PROJECT THE FUTURE?

A. No. Analysts' EPS growth rates can be quite useful in calculating estimates of what earned return on equity investors can expect in the future. As such, they are one of the inputs I use to determine long term sustainable growth rates. However, as explained above, using analysts' EPS growth rates mechanically in a simplified DCF calculation can provide inaccurate results.

[64] Marc H. Goedhart, Rishi Raj and Abhishek Saxena, *Equity Analysts: Still too bullish*, Spring 2010, page 16.

Q. WHAT IS YOUR CONCLUSION REGARDING DR. VANDER WEIDE'S DCF ANALYSIS?

A. Dr. Vander Weide's DCF result of 9.3% overstates DESC's cost of equity primarily because he mechanically uses analysts' growth forecasts. He does not make the necessary adjustments to ensure the growth is one that is reasonable to be sustainable in perpetuity. He supports his mechanical approach based on research completed many decades ago. The results of more recent research indicate that analysts' forecasts overstate investors return expectations. For the reasons stated above, my constant growth DCF cost of equity results (7.94% and 8.00%)[65] are a more accurate reflection of DESC's actual cost of equity.

C. Ex Ante Risk Premium

Q. PLEASE DESCRIBE DR. VANDER WEIDE'S EX ANTE RISK PREMIUM METHOD.

A. Dr. Vander Weide's Ex Ante Risk Premium method determines the cost of equity based on a regression analysis of DCF results applied to Moody's electric utility group and the yield to maturity on A-rated utility bonds monthly between September 1999 and May 2020.[66] He estimates that the relationship between the yield to maturity on A-rated utility bonds and the required risk premium is given by the following equation:

RP*proxy* = 8.21 - .581 x (yield to maturity on A-rated utility bonds)

He uses the results of this regression, represented in the above formula, to estimate investors' current required equity risk premium over A-rated utility bond yields. He

[65] See Exhibit ALR-4, page 1.
[66] Dr. Vander Weide's Direct Testimony, page 32, lines 11-23.

estimates the current risk premium of 5.64% by using a forecasted yield to maturity on A-rated utility bonds of 4.43% as follows: 8.21 - .581 x 4.4% = 5.64%. He calculates a 10.1% cost of equity result by adding the risk premium of 5.64% to the forecasted yield to maturity on A-rated utility bonds of 4.43%.[67]

Q. DO AGREE WITH DR. VANDER WEIDE'S EX ANTE RISK PREMIUM METHOD?

A. No. Even if we assume that Dr. Vander Weide's regression analysis accurately depicts the relationship between the calculated risk premium and interest rates, his 10.1% result significantly overstates the cost of equity because it relies on forecasted interest rate on A-rated utility bonds instead of investor expectations as indicated by current market yields. He claims that it's appropriate to use forecasted yield to maturity on utility bonds rather than current yield to maturity because: "(1) the fair rate of return standard requires that a company have an opportunity to earn its required return on its investment during the forward-looking period during which rates will be in effect; and (2) current interest rates reflect the unprecedented efforts of the Federal Reserve to preserve liquidity and encourage investment in the face of the economic crisis caused by the global COVID-19 pandemic."[68]

D. Ex Post Risk Premium

Q. Q: PLEASE SUMMARIZE DR VANDER WEIDE'S METHODOLOGY FOR DETERMINING EX POST COST OF EQUITY

[67] Ibid. Exhibit No.___(JVW-6), page 2 of 3.
[68] Ibid. page 34, lines 4-8.

A. Dr. Vander Weide derives Ex Post Cost of Equity of 9% by averaging the outcomes of two studies he conducts using market data from 1937 to 2020. His first study compares the average returns on stock and bond portfolios using stock price and dividend yield data on the S&P 500 with yield data on Moody's A-rated utility bonds. His second study compares the average annual returns of the SP Utility Stock portfolio with bond yield data on Moody's A-rated utility bonds. The result produces two risk premium estimates as follows:

S&P 500 average return:	11.41%
Moody's A-Rated Utility Portfolio:	6.74%
Risk Premium on SP 500:	4.67%
S&P Utility Index average return:	10.74%
Moody's A-Rated Utility Portfolio:	6.74%
Risk Premium on Utility Portfolio:	4.00%

Dr. Vander Weide states the following regarding how he completes his calculation: "Adding a 4.0 to 4.7 percentage point risk premium to the 4.43 percent yield on A-rated utility bonds, I obtain an expected return on equity in the range 8.4 percent to 9.1 percent with a midpoint estimate equal to 8.8 percent. Adding a 20-basis point allowance for flotation costs, I obtain an estimate of 9.0 percent as the ex post risk premium cost of equity."[69]

[69] Ibid. page 36, line 29.

Q. WHAT IS DR VANDER WEIDE'S RATIONALE FOR EMPLOYING THESE TWO STUDIES TO DETERMINE EX POST COST OF EQUITY

A. In his testimony, Dr. Vander Weide contends that "electric energy companies today face risks that are somewhere in between the average risk of the S&P Utilities and the S&P 500 over the years 1937 to 2020. Thus, I use the average of the two historically-based risk premiums as my estimate of the required risk premium in my ex post risk premium method."[70]

Q. DO YOU AGREE WITH DR. VANDER WEIDE'S EX POST RISK PREMIUM METHOD?

A. No. Dr. Vander Weide's use of a forecasted yield on A-rated utility bonds rather than current market yields considerably overstates the results of his ex post analysis. Considering that the yield on Baa-rated corporate bonds was 3.44% as of October 2020[71], it is certain that the yield on A-rated utility bonds is somewhere below that, or more than 100 basis points below the projected 4.43% figure used by Dr. Vander Weide. This adjustment would have a direct effect on the results of his ex post risk premium analysis, resulting in a cost of equity at least 100 basis points lower.

Other problems with Dr. Vander Weide's approach include: 1) the overstatement of the risk premium by including the comparison to the average returns of the S&P 500 at large, since the comparison to the average returns of the S&P Utilities for such a long historical period should be sufficient; and 2) his 20-basis point allowance for flotation costs, which is irrelevant to the cost of equity. However, these adjustments are more subtle

[70] Ibid. page 35, line 10.
[71] https://fred.stlouisfed.org/series/BAA

and have a smaller effect. Simply making the adjustment to the current yields on A-rated utility bonds stated in the previous paragraph brings the results of Dr. Vander Weide's ex post risk premium analysis well in line with my cost of equity recommendations.

E. CAPM Method

Q. PLEASE DESCRIBE DR. VANDER WEIDE'S CAPM METHODOLOGY AND CALCULATIONS.

A. The main components of the CAPM calculation are the risk-free rate, the company-specific risk factor (beta), and the expected return on the market portfolio.

Cost of equity = Risk-free rate + Equity beta x Market risk premium[72]

For his estimate of the risk free rate, Dr. Vander Weide uses a "forecasted yield to maturity on 20-year Treasury bonds of 2.84 percent, obtained using data from Value Line and the United States Energy Information Administration ("EIA")."[73]

For his estimate of beta, Dr. Vander Weide uses historical Value Line beats (0.87), including an adjusted Value Line beata (0.89) to account for the relationship between the risk premium of utility stock and the overall market[74]

He calculates both historical and a "forward-looking" risk premium as part of his CAPM analysis. His historical risk premium (7.2%) is based on the difference between the arithmetic mean total return on the S&P 500 from 1926 to 2020 (12.1%) and the average income return on 20-year U.S. Treasury bonds (4.9%).[75] Dr. Vander Weide's forward-looking risk premium (8.7%) is based on the difference between his DCF cost of equity for

[72] Ibid. page 37, line 12.
[73] Ibid. page 37, line 20
[74] Ibid. page 37, line 23.
[75] Ibid. page 38, lines 20-27.

the S&P 500 (11.5%) and the forecasted yield to maturity on 20-year Treasury bonds (2.8%).[76] his risk premium

Q. DO YOU AGREE WITH THE RESULTS OF DR. VANDER WEIDE'S CAPM ANALYSIS?

A. No, I do not agree with the results of Dr. Vander Weide's CAPM analysis because they are not based on investor expectations. He uses historical data (e.g. betas) and analysts' forecasts (e.g. interest rates, S&P's dividend, and earnings forecasts) instead of investor expectations as revealed by market data. Dr. Vander Weide's use of historical and non-market-based data in his "forward-looking" CAPM analysis contradicts his statement that the cost of equity should rely on "market-based data to quantify investor expectations." Stock option data indicates that investors expect betas for electric utility stocks to be lower than historical betas over the time periods used by Dr. Vander Weide (5 years and 10 years). Low yields on long-term U.S. Treasury bonds indicate that investors do not expect interest rates to increase any time soon because when interest rates increase the owner of a long-term bond will lose money.

Q. DOES DR. VANDER WEIDE USE AN APPROPRIATE RISK-FREE RATE IN HIS CAPM?

A. No. The risk-free rate component of Dr. Vander Weide's CAPM is not appropriate because it is based primarily on economist published projections and not investors' expectations as indicated by current market yields. As of September 30, 2020, the yield on 20-year Treasury bonds was 1.23%. Dr. Vander Weide includes a projected yield of 2.8%[77], instead

[76] Ibid. page 42, lines 2-15.
[77] Ibid. page 42, line 14.

of relying on current market yields, because the cost of equity should be "the forward-looking period during which rates will be in effect"[78] But the current yield on the 20-year U.S. Treasury bond indicates market expectations. If investors started to believe that the yield on long-term U.S. Treasuries was going to increase to 2.8% next year the price of 20-year U.S. Treasury bonds would fall until the yield was about 2.8% today. The current yield would be nearly the same as next year's yield because the price of bonds moves inversely to yields. Buying a 20-year bond today expecting interest rates to increase (more than double according to Dr. Vander Weide), would be the same as giving money away. Of course it is possible that interest rates will increase, but it is safe to say that the market does not expect that it is highly probable that interest rates will increase from 1.23% to 2.8% any time soon.

Q. DO DR. VANDER WEIDE'S BETA COEFFICIENTS OVERSTATE THE COST OF EQUITY?

A. Yes. Dr. Vander Weide's historical beta coefficients are higher than currently anticipated by investors and therefore overstate the cost of equity. He uses the current average Value Line beta (0.87) and the beta estimated from the relationship between the historical risk premium on utilities and the historical risk premium on the market portfolio (0.89).[79] Option-implied betas indicate that investors expect electric utility stock price movements to be less correlated with the overall market than before the pandemic. In December 2019, the average option-implied beta for my Electric Proxy Group was approximately 0.77. As of September 30, 2020, the average option-implied beta of these 36 electric utility

[78] Ibid. page 34, lines 1-6.
[79] [79] Ibid. page 37, lines 23-26.

companies was under 0.62. In other words, investors expect electric utility stocks to move a little over half a percent for every percent the market moves. Dr. Vander Weide's CAPM results likely overstate the cost of equity by hundreds of basis points because he uses historical betas instead of betas based on current investor expectations.

F. Expected Earnings Method

Q. PLEASE EXPLAIN THE COMPARABLE EARNINGS METHOD PRESENTED BY DR. VANDER WEIDE.

A. Dr. Vander Weide states that" The comparable earnings method estimates the required rate of return on equity by calculating the expected rate of return on book equity for a group of comparable risk companies."[80] In this case, Dr. Vander Weide's approach consists of estimating what investors expect to earn on the book value for the stocks of companies in his utility proxy group. He claims that return on book equity is relevant to the cost of equity. In order to estimate investors expected return on book equity, he relied exclusively on Value Line's projections. He starts with the publication's future expected return on book equity forecasts for electric utility companies for the years 2020 and the period 2023 to 2025. He increases these forecasts to account for the growth in new common stock.

Q. IS THIS METHOD VALID?

A. No. The overriding problem with Dr. Vander Weide's Expected Earnings Method is that it did not address the cost of equity at all. It simply considered the returns on book equity

[80] Ibid. page 43, line 4

that were achieved and are expected to be achieved by Value Line in the next 3 to 5 years. The earned return on book equity is an entirely different concept from the cost of equity.

VII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS IN THIS CASE.

A. Based on the evidence presented in my testimony, I conclude that the cost of equity allowed for the Company's retail electric service operations should be between 8.19% and 9.07% (recommended at 8.63%) with an overall cost of capital of between 7.33% and 7.76% (recommended at 7.55%) based on the average common equity ratio of the Electric Proxy Group (See Table 1 on page 3). My recommended cost of equity of 8.63%[81] is the midpoint of the range above (8.19% to 9.07%).

Dr. Vander Weide's cost of equity recommendation of 10.4% is unreasonably high, primarily because of his use of inflated "projected" data instead of investor expectations as indicated by capital market data, and technical flaws with his cost of equity models. The Company recognizes that a cost of equity below 10.4% would be sufficient, but its requested 10.25% cost of equity remains excessive.

My 8.63% (8.19% to 9.07%) cost of equity recommendation satisfies the requirements of *Hope* and *Bluefield* that regulated utility companies should have the opportunity to earn a return commensurate with returns on investments in other enterprises having corresponding risks. My recommendations are consistent with legal standards set by the United States Supreme Court and market data. My 8.63% (8.19% to 9.07%) cost of

[81] Exhibit ALR-3.

equity and an overall cost of capital (rate of return) of 7.55% (7.33% to 7.76%) will allow DESC to raise capital on reasonable terms while fulfilling their obligation to provide safe and reliable service.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.